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ECONOMIC LAW ENFORCEMENT

VOLUME II

STRENGTHENING ENVIRONMENTAL LAW ENFORCEMENT: AIR POLLUTION

The Judges, (detail American woodcut, 19th Century).

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CONNECTICUT ENFORCEMENT PROJECT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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ECONOMIC LAW ENFORCEMENT

VOLUME II

STRENGTHENING ENVIRONMENTAL LAW ENFORCEMENT: AIR POLLUTION

Final Report Submitted Under Contract #M00103910

by: The Connecticut Enforcement Project
Department of Environmental Protection
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PART 1

USING ECONOMIC CIVIL ASSESSMENTS

CHAPTER I

USING ECONOMIC CIVIL ASSESSMENTS TO ENSURE COMPLIANCE WITH EMISSIONS STANDARDS

In February, 1975, the Department sent several of its most recalcitrant sources of air pollution a certified letter notifying them that Connecticut's new economic approach to environmental law enforcement had become legally operative. The letter warned them that thenceforth they would be liable to an assessment equal to the full value of any further delay they experienced in complying with the terms of the order they had up until then been flouting. The letter included copies of the regulations authorizing the Department to impose economic civil assessments on sources violating an emissions standard or not complying with the terms of an order (Sections 602 and 603 of the Civil Assessment Regulations: See Part IV of this Volume.)

These letters had a quick and certain impact. Companies that had previously chronically experienced long overruns in meeting compliance deadlines suddenly experienced no more delay.

This chapter briefly summarizes how these new tools work, and the next chapter provides a similar brief profile of another, simpler economic civil assessment now being used by the Air Compliance Unit to induce sources to submit required progress reports promptly. Both chapters are brief overviews of how Connecticut's new economic approach to regulatory law enforcement, briefly described in Volume I, has been adapted to the particular problems of enforcing Connecticut's air pollution standards.

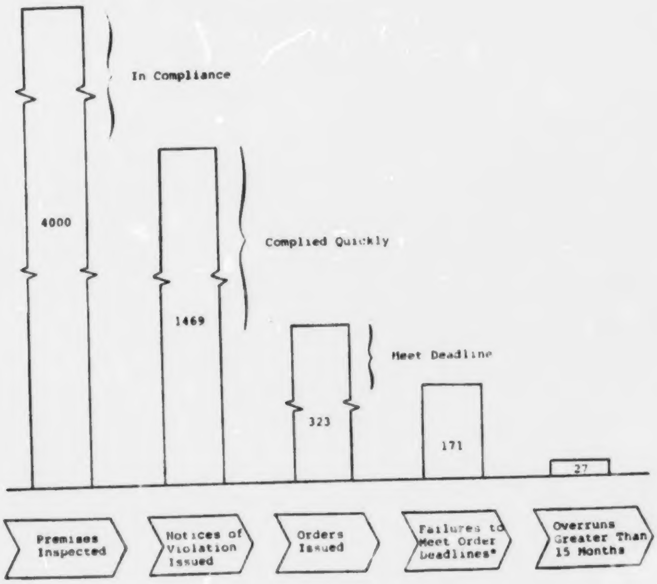
THE ENFORCEMENT RECORD

Connecticut's exceptionally vigorous air compliance enforcement program has been rewarded by a high level of voluntary compliance. Sources are told exactly what is expected of them; they are induced to propose their own compliance plans; and their progress is monitored closely. However, the Air Compliance Unit has not had the tools to deal effectively with a small number of cases that have persistently failed to comply. These cases consume a disproportionate and very large share of the Unit's administrative effort. Moreover, they pose a constant threat to the high level of voluntary compliance by others: "If competitor X has been able to avoid having to pay for abatement measures over the last several years, why should I rush to meet the State's deadline? Nothing will happen if I don't meet it, and, in any case, it's not fair to impose these costs on me and not on X." If the current level of voluntary compliance is undercut, administrative costs will soar as more and more cases require enforcement attention, and Connecticut's progress in cleaning the air will be threatened.

Connecticut's air compliance enforcement record is an excellent one. Of 4,000 registered sources of air pollution in July, 1974, only 323 had to be issued orders, and, of these cases, only 23 percent experienced cumulative delay longer than a month. However, a hard core group of 27 cases experienced more than 15 months' delay beyond scheduled (and often extended) compliance deadlines.

Air Enforcement Actions and Results

(number of cases 1971-1974)



Source: "Monthly Report of Activities, Air Compliance Unit", June 1974, Air Compliance files.

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* This estimate is based on a random sample of Air Compliance Unit files. It does not include those who meet amended order deadlines.

This record contrasts not only with that of many other states but with that of other Connecticut programs. For example, because the Water Resources Unit has not had the staff or the enforcement powers necessary to make the State's laws regarding coastal filling credible, most such filling is done in complete disregard of the law.

The hard core of intractible cases that have not responded to repeated reasonable persuasion, bluff, and threat are a serious problem. Thirteen percent of all sources put under order account for 75 percent of all accumulated delay in order compliance. Eight percent account for 56 percent. These "worst cases" overrun their compliance deadlines by an average 267 percent. They cost the Department 75 percent more to process than the average case, 137 percent more than sources that comply on schedule.

These are cases of willful noncompliance. It takes the Department almost twice as long to get these sources into pre-order conference as the average case, almost three times as long as the average case that complies on schedule. They do not come from a common industry. (If they did, one might suspect that companies in that industry were faced with particularly intractible technical problems; however, coming as they do from industries where others have complied promptly, these sources cannot rely on such an excuse.) Nor do they represent a similar size of operation.

What these hard-core recalcitrants do share is the appropriation of significant economic savings from noncompliance to themselves. For example, for every month an asphalt batching plant delays installation of a baghouse capable of cleaning 20,000 actual cubic feet per minute of particulate-laden air, it will save $1666.25. This sort of financial inducement to noncompliance must be counterbalanced if these sources are to be made to comply.

The Department has not had the tools necessary to provide such incentives. It has had only two responses available to it when faced with noncompliance.

* It could persuade, compromise what it required, cajole, bluff, and threaten. The Air Compliance Unit has used a skillful blend of these approaches to achieve the results it has to date.

* It could go to court to seek an injunction and/or any of a wide variety of penalties theoretically available. However, this response is, at best, slow, costly, and uncertain. To date the courts have issued three injunctions and no penalties or other sanctions in all Air enforcement cases sent them. (See Part II, page 36.) Not surprisingly, some businessmen have perceived the economic benefits of noncompliance as being significantly greater than the risk of serious enforcement sanctions.

Most cases will always be handled by the first of these approaches. However, it is not enough by itself; to be credible, persuasion must be backed up by an effective "next step." The Department has needed an adequate, more sure, quicker enforcement next step than it has had to date.

ADMINISTRATIVELY-IMPOSED ECONOMIC ASSESSMENTS

The Department's new administratively-imposed, economic civil assessments give it the tool it has needed. These assessments are just large enough to make compliance pay, and they are imposed quickly and easily by the Department, without having first to wait for court action. These two benefits are tightly linked: it is use of the economic standard that makes administrative imposition philosophically and legally acceptable.

Administrative Imposition

By allowing the Department to impose civil assessments (and to require regulatees to post, and perhaps forfeit, sureties) itself, the delay, cost, and uncertainty of relying on the judicial process to provide enforcement back-up is simply eliminated.

Once the Department determines that a source is not in compliance and has been given the requisite notice, it can calculate the appropriate assessment and send the source a notice of violation informing it of the grounds for the assessment, the amount assessed, and the source's right to request a hearing within twenty days. If the source does not request a hearing within this time period (or if the hearing and possible subsequent judicial review fail to invalidate the assessment), the assessment becomes a fully enforceable final order. If the source does not pay what is required in such a final order, the order will be enforced by the Sheriff exactly as if it were a court judgement.

This delegation to the Department would be disturbing philosophically were it not carefully limited. Without the safeguards built into the regulations, most of which were required by the legislature, such a delegation might well be seen as giving too much power to the regulator, leaving the citizen exposed to excessive executive discretion.

The regulations provide a long list of carefully drafted substantive and procedural safeguards to protect the regulatee. Except for repeat violators, no one may be assessed without actual prior notice of what they are required to do and of their potential liability under these regulations for failing to do so. Every action of the Department is subject first to an administrative hearing conforming to the requirements of the Connecticut Administrative Procedure Act and to the Department's own Rules of Practice and then to judicial review.

By far the most critical safeguard is the economic standard used to determine the amount of each assessment. Each assessment cannot be larger than the total benefit the regulatee has realized by delaying compliance. Tying the assessment to this standard:

- **makes remedy-setting a ministerial task, not a discretionary one (although the Department still has the discretion not to impose an assessment or to mitigate it.)**

- ensures that the assessment is remedial and not punitive, civil and not criminal. (This safeguard is critical because, if the assessment could be larger than the amount needed to remove the incentive not to comply, a court might determine that the assessment was punitive and therefore criminal. Criminal penalties can only be imposed by a court.)

- ensures that no regulatee can be assessed any more than it has actually saved by not obeying the law.

The standard's accuracy is assured by a final, critical safeguard: the correction hearing. If a regulatee, once in compliance, can demonstrate that actual costs were lower than the estimates used in calculating the inital assessment, it is guaranteed that its assessment will be lowered. The Department must return, with interest, the difference between what was and what should have been paid.

Economic Assessments

The heart of the Department's new enforcement approach, then, is its economic standard. This standard (1) ensures that those contemplating noncompliance are confronted with just the right level of incentive and (2) makes prompt imposition of this incentive possible.

Economic civil assessments counterbalance all the benefits of delaying compliance:

- Avoiding whatever portion of the installed capital costs of control facilities that would be attributable to the period of delay in accounting for real (as versus tax) depreciation of the facilities.

- Avoiding the costs of operating and maintaining these facilities during this same period, and

- Avoiding the opportunity costs of investing in a no-yield abatement project rather than investing the money at a profit.

Once the Department has determined what these three cost factors are, it uses business's familiar capital budgeting formula to determine what each month's delay is worth to the regulatee. It then imposes an assessment in that amount for every month's noncompliance.

Because the basis for the assessments includes the regulatee's opportunity costs, these assessments make compliance positively attractive. In effect, they allow the State to guarantee that pollution abatement projects will yield the same return as commercial investments: making the required abatement investment absolutely guarantees the source that it will not be assessed a monthly charge based on both the cash outlays required for the investment and a commercially attractive yield it could earn on these outlays.

(These economics are explained more fully in Volume I and in detail in Part III of this Volume.)

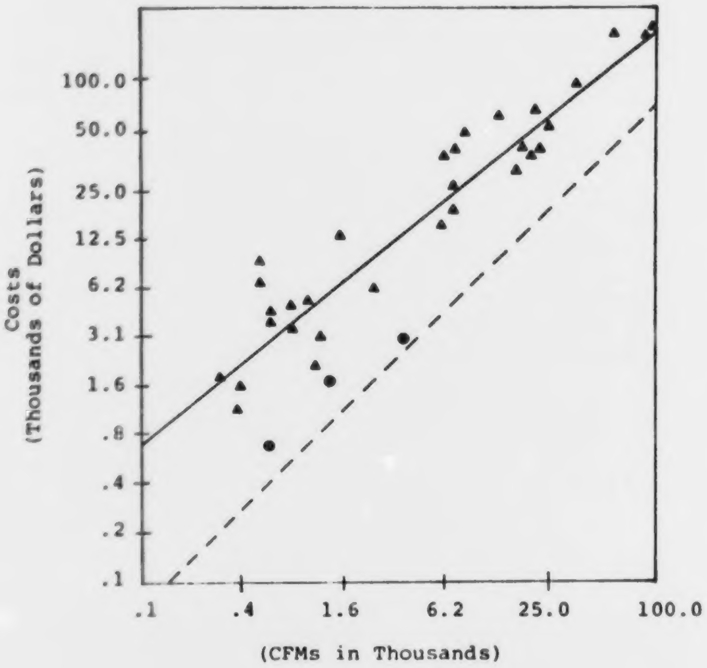
Administering Economic Assessments

Economic civil assessments are easy to use. With the use of available cost curves and tables, most of the necessary data can be estimated reliably in a few minutes. Once this information is available, a simple economic formula fed into a desk calculator will adjust for tax, inflation, and other variables and calculate the correct assessment in seconds.

The two most important pieces of information needed to determine the correct assessment amount are (1) the installed capital costs and (2) the annual operating and maintenance costs. If these basic costs of compliance had to be estimated case-by-case, the administrative cost of imposing each assessment might well become a significant problem. However, in almost all cases, cost curves linking these costs to the number of actual cubic feet per minute (ACFM) of polluted air requiring treatment, a readily available figure, have been developed. They make the task of obtaining these two inputs quite simple.

Following through the case of the delinquent asphalt batching company will demonstrate just how simple these cost curves make the job of estimating capital and O&M costs. Assume that a Department engineer detects a noncomplying asphalt batching company and that the Department decides to impose a civil assessment. It must determine the capital and O&M costs the company should have met to be in compliance. All the engineer need do is (1) note the number of ACFM's requiring treatment (2) look up the appropriate cost curves in Chapter VII of Part V of this Volume and (3) read the appropriate cost estimates off the curves.

PARTICULATE CONTROL COSTS - BAGHOUSE



Source: EPA Publication AP-51, PP 164, 175.
Connecticut Tax and Registration Forms.

Using the capital and the O&M cost curves for baghouses used to control particulates shown above, the Department engineer would read up from the point on the bottom scale representing 20,000 ACFM's (the volume of air requiring treatment at the batching company's plant) to the point on the cost curves immediately above --$50,000 for the installed capital costs and $13,500 for the annual operating and maintenance expense.

These cost curves, drawn chiefly from national data and checked against actual Connecticut cases, are generally reliable. In most cases, estimates based on these cost curves will probably not over/underestimate actual costs by a significantly greater amount than will the much more time-consuming, case-by-case estimates -- and -- in any case, the regulations guarantee of correction with interest once a source comes into compliance makes total initial accuracy unnecessary.

Other variables are determined with even less trouble. The cost of capital for a regulatee's industry is read off a list. The inflation factor in the formula needs to be updated only once a year -- and then it is merely a matter of averaging the changes in an easily available price index over the preceding three years.

INDUCING COMPLIANCE WITH EMISSIONS STANDARDS AND ORDERS

This new enforcement tool is being used to induce sources of pollution to move to comply with the State's emissions standards promptly.

Sections 602 and 603 work closely together towards this end. Section 602 imposes assessment liability if a source emits more than the State standards permit -- unless the source is moving to control its emissions pursuant to an order. Section 603 authorizes assessments for delay in complying with the terms of an order. In both cases, the assessment is designed to counterbalance the benefits of deferring the cost of controlling the polluting emissions, and a month's delay by a source would give rise to exactly the same assessment under either regulation.

Emissions Assessments

Polluting facilities that have not installed the equipment necessary to control their emissions are liable to Section 602 assessments. Repeat offenders and those with actual prior notice can be assessed for the value of up to two years of past noncompliance. All sources are liable from the moment they are detected and notified that they are not in compliance until they either comply or are proceeding under an order to do so.

The most important purpose of these regulations is to encourage sources that are not in compliance with applicable emissions standards to come to the Department and agree to an order setting forth a specific schedule of steps leading quickly to full compliance. The regulation will encourage such cooperation because it makes continuing noncompliance risky and because it rewards cooperation with the Department.

The Department will not impose a 602 assessment once the regulatee has agreed to an order. (The Department, of course, retains the right to issue an assessment before issuing an order.) By signing an order before receiving an assessment, the regulatee avoids all Section 602 liability, including up to two years of predetection noncompliance, plus however many months have passed since detection. The regulatee can only become liable to civil assessment again if it falls behind schedule. Even then, this new liability is not likely to become nearly as large as the regulatee's potential liability under Section 602 had been.

Liability under Section 602 will also provide insurance against regulatees contesting orders as a means of frustrating the Department's effort to tighten the enforcement of order terms. Without this insurance, regulatees may be influenced by the existence of Section 603 to contest abatement orders more frequently than they have in the past. Previously accepting an order was painless; if its deadlines were not met nothing would happen. With 603 in place, however, accepting an order means accepting some risk of assessment. This risk could, however, be avoided for little cost simply by contesting the abatement order. As long as an order remains contested, which could be quite a long time given the pace of both administrative hearings and judicial appeals (especially if there were suddenly a great many contested cases to process), the order is not legally binding and cannot be enforced by Section 603. The hard-core recalcitrant would no doubt seize on such a loophole quickly. Others might as well, thereby adding to the Department's administrative costs and slowing compliance significantly.

Having regulatees liable to Section 602 assessments protects against such an outcome. It gives the Department a powerful plea-bargaining lever. If a regulatee chooses to contest rather than comply promptly, the Department can impose the 602 assessment.

The regulatee's rights are not threatened by this plea-bargaining device. The regulatee cannot be charged more than what it saved by not being in compliance. If it wins its appeal, any portion of the assessment that was rejected at the hearing or by a court on subsequent appeal would be returned to it with interest. Thus, the assessment merely neutralizes the incentive to use contests as a means of postponing compliance expenditures. A regulatee that feels it has good grounds for contesting an order will still do so: the benefits it can expect if it wins will not be reduced in any way by the 602 assessment. Further, if the regulatee can convince a judge of the need, a court can stay either the collection and/or the cumulation of the assessments during an appeal.

Assessments for Order Noncompliance

Once Section 602 has induced noncomplying facilities to move to comply and they are under order, Section 603 ensures that they comply with the terms of the order by the deadlines specified in its compliance schedule.

This incentive works very simply. For every month or portion thereof that a source falls behind schedule, it becomes liable to an economic assessment equal to the value of delay for that period.

The Department will not impose these assessments immediately, however. Its purpose is to induce rapid compliance, not to collect assessments. It will first warn the regulatee that it is liable, but that it can "catch up" and still meet the final compliance deadline, in which case it will have erased the liability. If such warning letters do not have the desired effect, the Department can try to bring the regulatee up short by imposing any of several surety requirements on it. (These devices can provide a whole series of gradually escalating responses to continuing delay. Volume I explains these devices and how they can be used.) Ultimately, if these devices do not work, the Department will have to impose the full civil assessment. In some cases, e.g. repeat offenders, it may want to do so immediately. In any case, the Department's ability to impose such less severe incentives, e.g. surety requirements and forfeitures, rests on its ability to impose the full civil assessment if the regulatee balks at the alternative. However, the Department's ability to impose economic civil assessments should greatly improve its credibility. As a result it rarely should have to do more than warn those who begin to fall behind. The impact of the first set of 602/603 warning letters demonstrated how effective a credible warning can be.

* * * * * * * * * * * * * * *

The Department's new administratively-imposed economic civil assessments gives it the ability to force even the hard-core recalcitrants to comply promptly. Consequently, it can expect an even higher level of voluntary compliance than it has experienced to date. This will mean a 22-43 percent saving in the Department's administrative costs and continued rapid progress in cleaning Connecticut's air.

CHAPTER II

USING ECONOMIC CIVIL ASSESSMENTS TO INDUCE PROMPT FILING OF PROGRESS REPORTS

The Air Compliance Unit requires sources under order to submit monthly reports indicating exactly what progress towards compliance has and has not been made since the last report. These progress reports (1) make it difficult for regulatees to forget or let slide their commitments to come into compliance and (2) allow the Department to track regulatee progress with fewer time-consuming phone calls and field inspections than would otherwise be necessary.

However, if they are not submitted, or if they are incomplete or very late, not only do they not serve these purposes, they become an administrative burden to the Department. Delinquent reports require follow-up.

In the early summer of 1974, 44 percent of all progress reports due were missing or seriously late. After a concerted follow-up campaign, 17 percent were still delinquent. And 25 percent of the reports submitted were incomplete.

Beyond such cajoling and reminding there was nothing the Department could realistically do. In theory, it could ask the Attorney General to go to court to seek an injunction and/or up to $180,000 a week in various penalties. This is, however, a silly theory. Even for those who flagrantly disregard emissions standards, the Department has found seeking a court remedy to be an expensive, ever-so slow, and uncertain procedure. For a small, if useful, procedural requirement, this option is simply too expensive: the careful procedures and safeguards built into the process are designed to protect citizens when a great deal is at stake; they render the process unuseable for such small, procedural matters. The long delays inherent in these procedures also make this response laughably inappropriate as a means of enforcing the submission of reports that become largely useless within a month when the next report is due.

In late 1974, the Department introduced economic civil assessment regulations that would allow it to enforce its progress report requirements. These regulations (1) prescribe the form, timing, and content of progress reports (Section 19-508-12(f) and (2) impose uniform financial liability for failure to meet any of these requirements (Section 22a-6b-601).

Section 19-508-12(f) became necessary once enforcement was to be tightened up. It makes clear exactly what is required, thereby protecting the regulatee from unforeseeable liability and the Department from the arguments (1) that the regulatee didn't know what was required and (2) that perhaps no violation had taken place.

These economic civil assessments are fixed fee charges: $50 for the first delinquent or incomplete progress report, $100 for subsequent violations. Such fixed charges are appropriate because (1) the costs to regulatees of complying with the reporting requirements do not vary far from these figures and (2) the size of the assessment does not warrant case-by-case measurement.

The two assessment rates are based on a survey conducted by CEP of the costs of gathering the information required for a progress report, writing the report, and transmitting it to the Department. The $50 initial charge is just above the average cost to the regulatees sampled of reporting. The second $100 charge is designed to provide an adequate incentive for those regulatees whose reporting costs are above the average. The sample indicated that these charges should be adequate to counterbalance the economic incentive not to comply.

These assessments should do more than remove the incentive not to comply. Lower level staff likely to be responsible for reporting will probably be mildly embarrassed explaining why they need to have a check made out to the Department.

More important, the Department can use this small, simple civil assessment as a warning demonstration, a shot across the regulatee's bow. Once a regulatee has paid its first $50 check to the Department, it will have been made fully aware of the Department's new power to impose assessments administratively. Since, not surprisingly, sources that are seriously behind on their compliance schedules are also quite likely to have a record of progress report delinquency, the Department will usually be able to use a progress report civil assessment as a Section 602/603 warning device as well as a Section 601 enforcement tool.

The Department's new regulations should improve the results of the progress report program while cutting costs. These regulations should cut the existing delinquency rate to roughly a quarter of what it is now. They should reduce the number of incomplete reports by 55 percent. They should also cut staff time devoted to enforcing the progress report requirement by 40 percent. In short, the Department's new regulations should have substantial program benefit while conserving staff resources.

PART II

BASELINE PROFILE OF THE ENFORCEMENT PROCESS FOR PRIVATE AND INDUSTRIAL SOURCES IN THE AIR COMPLIANCE ENFORCEMENT UNIT

PREFACE

Designing - and later evaluating - a new enforcement program for the Department of Environmental Protection requires an accurate and comprehensive understanding of:

1) The enforcement problems currently posed by Connecticut polluters, and

2) The existing administrative processes now used to handle these problems.

This document summarizes the Connecticut Enforcement Project's baseline analysis of the current enforcement practices of the Department of Environmental Protection.

This analysis contains three chapters, each one focusing successively on narrower and more difficult enforcement problems.

> The first chapter describes the nature and scope of the Department's "usual" enforcement effort. It examines the efficacy of the two enforcement mechanisms, notices of violation and state orders, as they are applied to all regulatees. The Department's enforcement experience with most sources indicates a general pattern of compliance and cooperation. This chapter is divided into 3 sections: (1) inspections, the primary means by which violations are detected; (2) notices of violation, the Department's preliminary enforcement mechanism; and (3) orders, the Department's main enforcement tool.
>
> The second chapter examines Department experience with polluters who delay their compliance with state orders. Half of those sources issued orders fail to meet their compliance deadlines and overruns in these cases average five months of delay - increasing the interval between detection and compliance by 38%. These sources also impose great costs on the Department since DEP personnel spends about 64% more time on these cases than it does on sources who comply with their orders.
>
> The third chapter analyzes enforcement experience with the small "hard-core" of violators who cost the Department the most time and effort. This group of cases, about 8% of all orders issued, account for 56% of all compliance overruns. They tend to come from the same industries as most order recipients and to have the same number of employees, but they comprise an exceptional group in that they impose on the Department 137% more costs per case than do sources which comply with their orders.

This study points to the specific problems of enforcement which provided the framework for the Connecticut Enforcement Project's design of an economic enforcement system. While the baseline of enforcement problems is always changing, this study should also provide a starting place from which the impact of the new enforcement system can be measured.

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SUMMARY OF FINDINGS

An analysis of a random sample of 48 Air Compliance cases (7% of all cases) from October 1971 to July 1974 reveals the following profile of the enforcement process:

I. In terms of usual enforcement experience:

-- 4 weeks elapse between the time of detection and the time when a notice of violation is issued.

-- 3.7 months pass from the day of issuance of a notice of violation until the day an order is signed.

-- 7 months pass from the day an order is signed to the day compliance is scheduled.

II. In terms of enforcement experience with order overruns:

-- Over 50% of the orders issued were not completed by the time required in the compliance timetable.

-- Order recipients who delay overrun their compliance deadlines by an average of 5.1 months.

-- Over 30% of the orders issued are completed by means other than the plan originally proposed in the compliance timetable.

-- Regulatees blamed third-party delay for over 65% of all missed compliance deadlines.

-- Over 17% of the progress reports required by the compliance timetable are either never submitted or submitted late.

III. In terms of enforcement experience with the most difficult cases:

-- 8% of all orders issued account for 56% of all delay and 13% of all orders issued account for 75% of all delay.

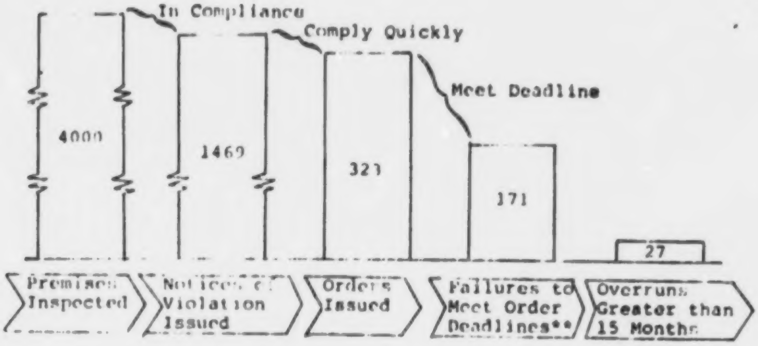
-- The "worst 8%" are not differentiated from the general order group by industry although they do tend to be either large or small in size.

-- The "worst 8%" have delays which are 65% greater than average orders and which impose 135% more cost on the Department than the average order.

INTRODUCTION: GENERAL ENFORCEMENT

MOST SOURCES INSPECTED BY DEP ARE ALREADY IN COMPLIANCE OR COMPLY QUICKLY.

Air Enforcement Actions and Results*
(number of cases 1971-1974)



On each of the following pages, the five bar graphs shown above will appear in the upper left-hand corner. The shaded bar graph indicates which of the above categories is under discussion.

Source: "Monthly Report of Activities, Air Compliance Unit", June 1974, Air Compliance files.

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* Enforcement actions taken between 10/1/71 and 5/31/74.

** This estimate is based on a random sample of air files. It does not include those who meet amended order deadlines.

DISCUSSION: Connecticut's citizens have been extraordinarily cooperative in working to clean the State's air. Since October of 1971 (when the DEP assumed responsibility for coordinating and enforcing this effort) less than 4% of the over 10,000 registered sources of air pollution had to be issued orders. Only 47% of those issued orders were delayed in any way. In other words, 98% of all Connecticut sources either complied on their own or did so promptly after being contacted by the Department.

On the other hand, a handful of sources have willfully sought to evade or at least delay complying with Connecticut's standards.

The State's new economic enforcement approach is designed to work equally well for both groups. It is intended to be a tough, loophole-free system that will not let the willful scofflaw through. On the other hand, and just as important, it is intended to have no effect, to impose no new burdens, on the law-abiding majority.

CHAPTER I

THE ENFORCEMENT PROCESS

INSPECTIONS

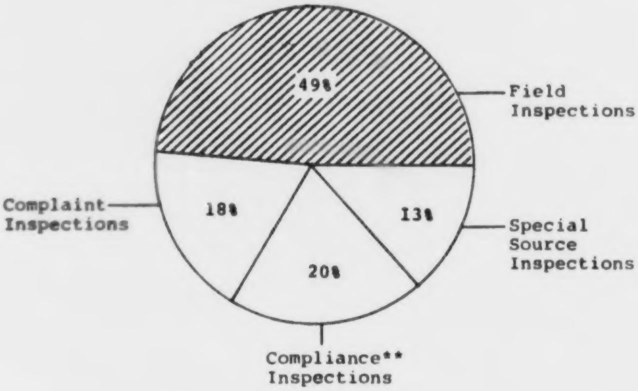
The Department relies primarily on field inspections to detect or confirm cases of noncompliance.

- Half of all inspections are annual, pre-announced inspections of major sources.
- 25 percent of all field inspections find violations of air standards.
- Most commonly, detections result from citizen complaints.

Inspections

MOST INSPECTIONS+ ARE ANNUAL, PRE-ANNOUNCED "PIQ" INSPECTIONS MADE OF SOURCES KNOWN TO HAVE SERIOUS POLLUTION POTENTIAL.

Types of Inspections*



Source: Random sample of Air Compliance files, 1971-1974; Interviews with Air Compliance Unit staff.

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* Analysis of 3053 inspections conducted 6/1/73 to 5/31/74.

** Assumes one compliance inspection for each notice of violation issued, excluding motor vehicle emissions violations.

There are four types of inspections:

- Inspections made in response to citizen complaints. If it is not possible to determine whether or not there is a violation from checking the Department's files, the DEP will conduct a field inspection.

- "PIQ" (Pre-Inspection Questionnaire) inspections. The Department inspects sources with significant pollution potential regularly, usually once a year. Before each inspection, the Department requests that the source answer questions about its processes: hence the term "Pre-Inspection Questionnaire".

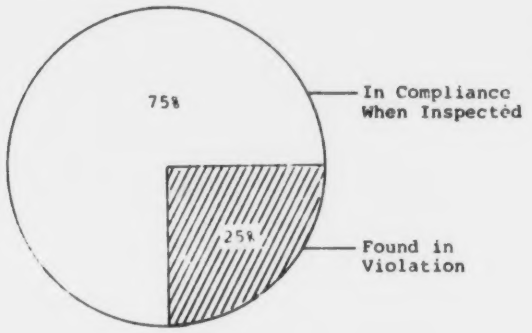
- Special source inspections. From time to time the Department decides to inspect certain types of sources with particular pollution problems, such as gasoline storage facilities.

- Compliance inspections. When a source is found in violation, it is given a specified period of time to achieve compliance. When the source reports that it is in compliance, the Department will inspect the site to verify the claim.

Inspectors also spot violations while on "area surveillance"; they sometimes patrol certain areas to watch for motor vehicle exhaust violations, and may see stationary sources violating visible emissions standards.

Inspections

25 PERCENT OF ALL INSPECTIONS FIND VIOLATIONS OF AIR STANDARDS.



Inspections Resulting in Notices of Violation*

Source: Air Compliance Files; Interviews with Air Compliance Unit staff.

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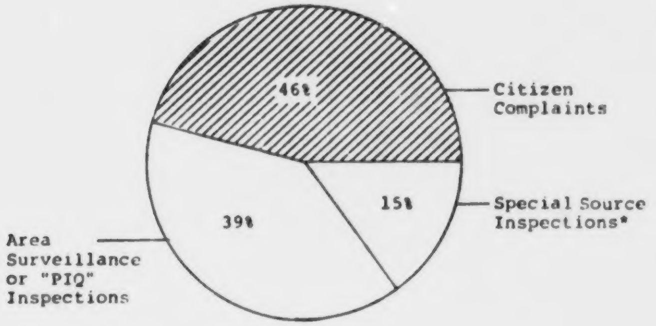
* Data is based on all inspections, excluding compliance inspections, and all notices of violation , excluding motor vehicle violations, issued between July 1,1973 and May 31, 1974.

ALMOST HALF OF THESE DETECTIONS ORIGINATE FROM CITIZEN COMPLAINTS.

Origins of Detections



Source: Random sample of notices of violation issued from October 1971 to May 1974.

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* Inspections resulting from policy decision to inspect particular type of source.

COMPLAINTS BY CITIZENS HAVE ALSO PROVEN TO BE QUITE RELIABLE--NOTICES OF VIOLATIONS RESULTED IN 13 OF THE 15 CASES EXAMINED.

NOTICES OF VIOLATION

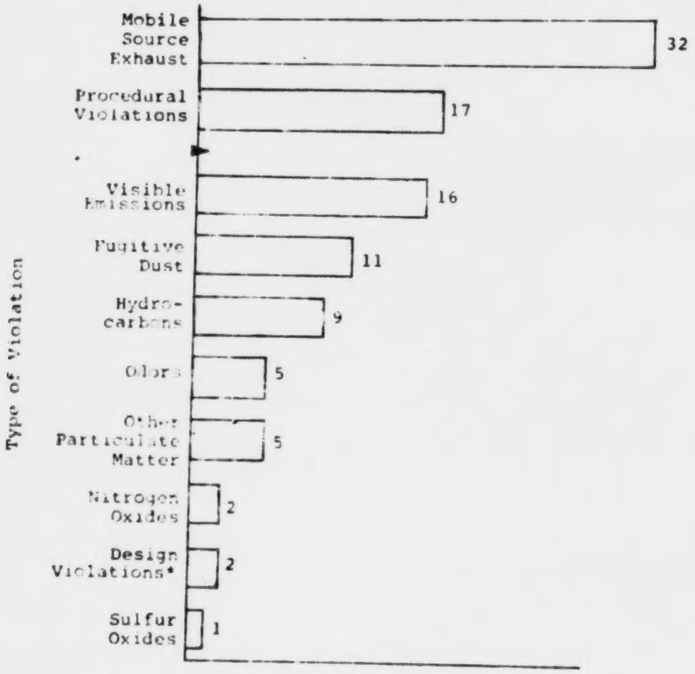
Sources found in violation are issued "notices of violation". These notices allow the source 30 days to achieve compliance before an order is issued by the Department.

- Easily correctable mobile source and procedural violations account for half of notices issued.
- Particulate violations account for two-thirds of the rest of notices issued.

Notices of Violation

MOBILE SOURCE AND PROCEDURAL VIOLATIONS ACCOUNTED FOR HALF THE NOTICES OF VIOLATION ISSUED BETWEEN OCTOBER 1, 1971 AND MAY 31, 1974.+

Notices of Violation, by Type of Violation
(percent of all notices of violation)



Source: "Monthly Report of Activities: Air Compliance Unit", June 1974.

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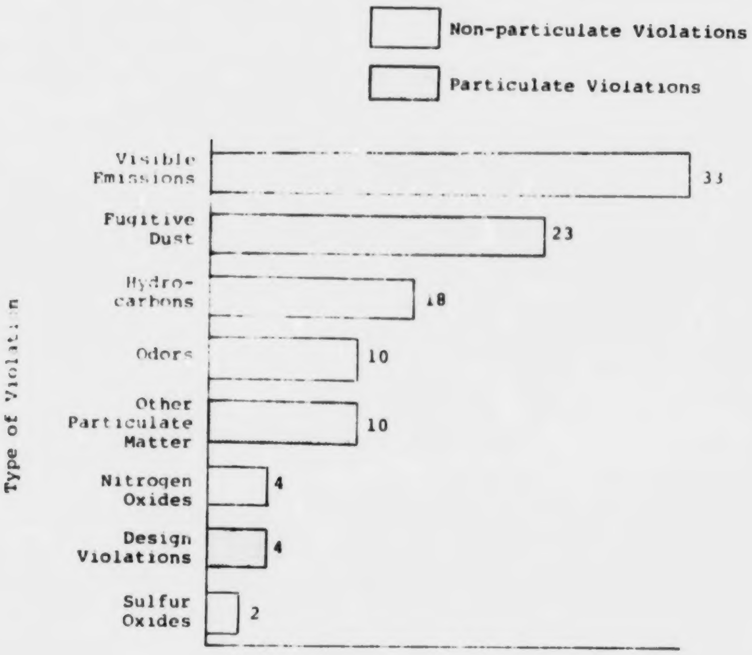
* E.g. flue-fed incinerators.

+ The unit treats mobile source emissions differently than other emissions violations, following up such violations by letter rather than initiating expensive order proceedings. Procedural violations are easily correctable violations of registration or permit requirements.

Notices of Violation

OF THE NOTICES OF VIOLATION GIVEN FOR VIOLATIONS OF EMISSIONS STANDARDS, 70 PERCENT ARE GIVEN FOR VIOLATIONS OF PARTICULATE STANDARDS.

Notices of Violation, by Type of Violation
(percent of emission standards violations*)



Source: "Monthly Report of Activities: Air Compliance Unit", June 1974.

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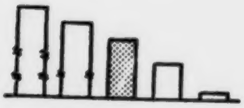
* Excludes mobile source and procedural violations.



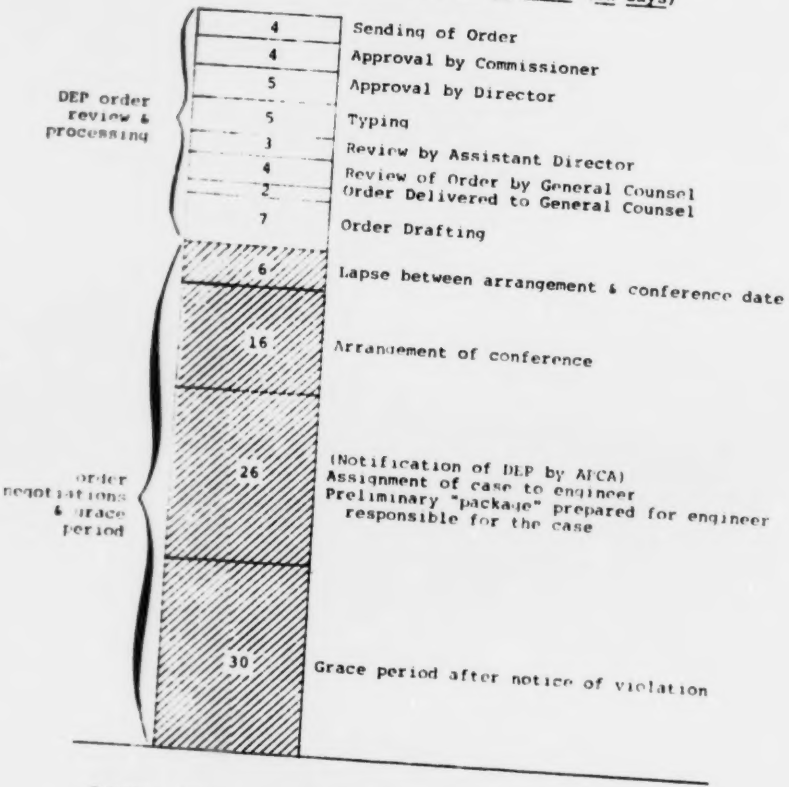
ORDERS

If a source previously issued a notice of violation fails to comply within the specified period of time, the Department issues an order, usually after negotiations, requiring compliance, and usually specifying dates by which incremental steps toward compliance are to be achieved.

- 3.7 months typically pass between the issuance of a notice of violation and of an order.
- 22% of those who receive notices of violation are also issued orders.
- Some types of violation, like particulates and odors, regularly require orders.
- As a result, half of all orders issued are for abatement of particulate violations.
- Those members of the Air Unit most directly responsible for enforcement actions spend 40% of their time on particulate violations.
- Despite the predominance of one type of pollutant in enforcement actions, no pattern in the size of companies under order is apparent.
- Nor is there any obvious pattern in the industrial composition of companies under order.
- Only 3% of all order recipients seek to contest their order, and only half of the hearings requested ever have to be held. This low appeals rate is one indication that the orders are widely accepted as reasonable.
- Violators achieve compliance in many different ways. Most commonly, they must add abatement equipment to meet air standards.
- Violators who must add abatement equipment are allowed 57% more time than the average order recipient to meet air standards.
- 36% of the time allowed in such abatement orders is for equipment delivery.

THE DEPARTMENT TYPICALLY ISSUES ORDERS TO NONCOMPLYING REGULATEES 112 DAYS (3.7 MONTHS) AFTER THE ISSUANCE OF A NOTICE OF VIOLATION.[+]

Average Time Required for Steps between the Issuance of a Notice of Violation and of an Order (in days)



Source: Random sample of Air Compliance Orders.

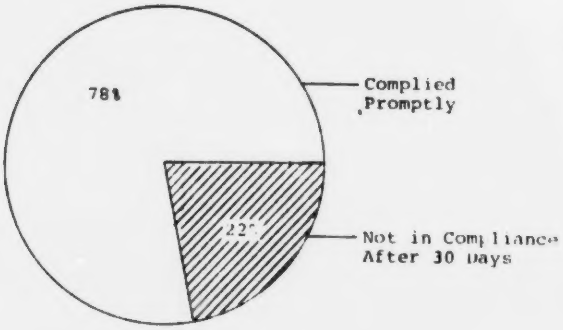
DISCUSSION: The first 78 days (70%) of the pre-order period consists of (1) allowing a regulatee a reasonable period of time to comply, (2) assembling materials relative to the case and commencing informal communications with the regulatee, and (3) arranging a conference between DEP personnel and company officials. In short, most of this time is devoted to ensuring that the regulatee understands what is required of him and has sufficient time to develop a concrete, realistic compliance plan. The remaining 34 days, in which an order reflecting discussions with the regulatee is drafted and reviewed, demonstrates a record of reasonably prompt review by each DEP staff office that must approve an order before it is promulgated.

[+] Processing time includes weekends. Adjusting for a five day week, orders are issued in 80 working days after the issuance of a notice of violation.

Orders

22 PERCENT OF ALL VIOLATIONS ARE NOT CORRECTED (OR CAN NOT BE CORRECTED) WITHIN 30 DAYS.

Percent of Cases Issued Notices of Violation in Compliance at the End of 30 Days, 1971-1974



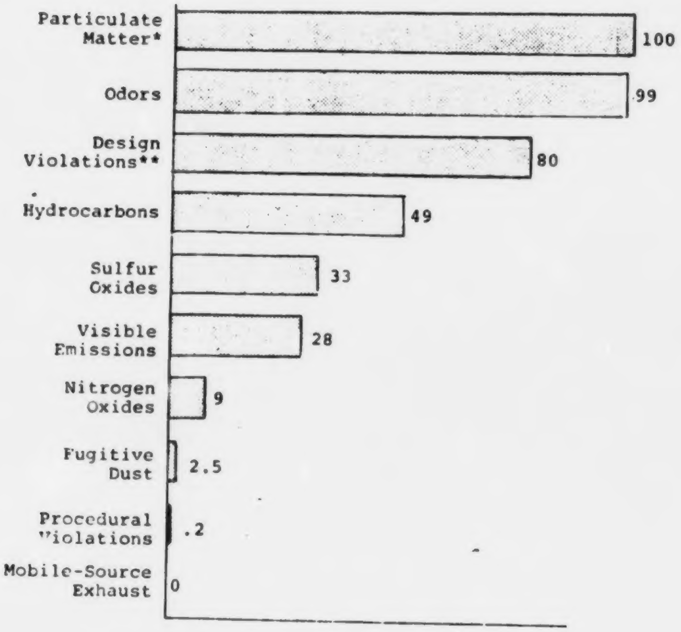
Source: "Monthly Report of Activities: Air Compliance Unit", June 1974.

THE DEPARTMENT COMMENCES THE ORDER PROCESS FOR THE 22 PERCENT STILL NOT IN COMPLIANCE AT THE END OF 30 DAYS.

Orders

CERTAIN TYPES OF VIOLATION GENERALLY LEAD TO ORDERS, E.G. PARTICULATE AND ODOR VIOLATIONS; OTHER TYPES ARE TYPICALLY CORRECTED QUICKLY AND DO NOT REQUIRE ORDERS.

Percent of N.V.'s Going to Order, 1971-1974



Source: "Monthly Report of Activities: Air Compliance Unit", June 1974.

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* Excludes visible emissions and fugitive dust.

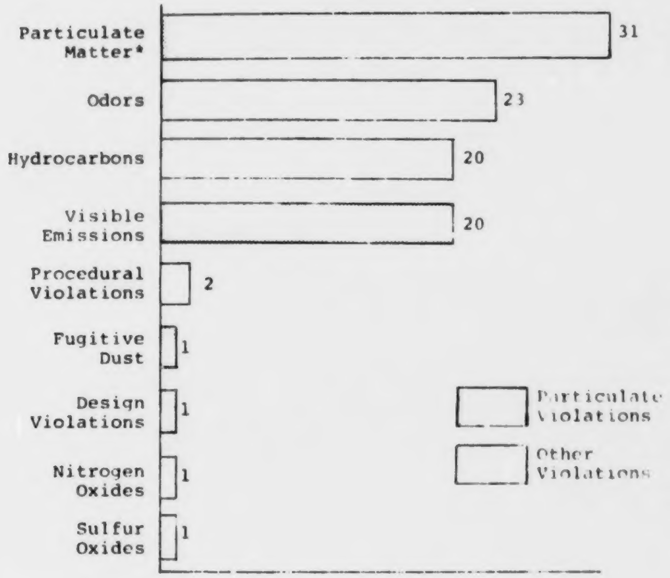
** Flue-fed incinerators.

DISCUSSION: The percent of notices of violation (N.V.'s) that go to order is a good indication of how difficult and expensive it will be for a class of cases to comply with the air standards.

Orders

OVER HALF OF ALL ORDERS ISSUED BETWEEN OCTOBER 1, 1971 AND MAY 31, 1974 WERE FOR ABATEMENT OF PARTICULATE VIOLATIONS.+

Percent of All Orders by Type of Violation, 1971-1974



Source: "Monthly Report of Activities: Air Compliance Unit", June 1974.

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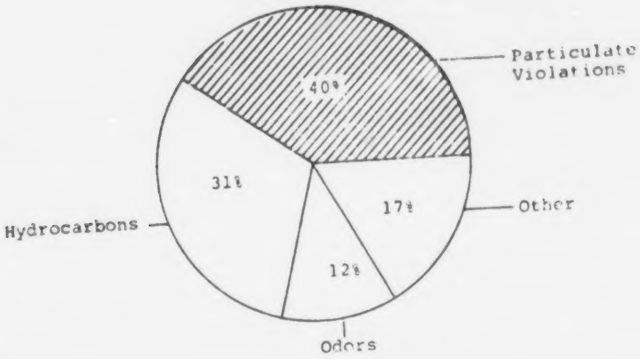
* Excludes visible emissions and fugitive dust.

+ Only 2% of orders issued were for procedural or motor vehicle violations.

Orders

THE ENFORCEMENT CONTROL CENTER SPENDS 40 PERCENT OF ITS TIME ON PARTICULATE CONTROL CASES.

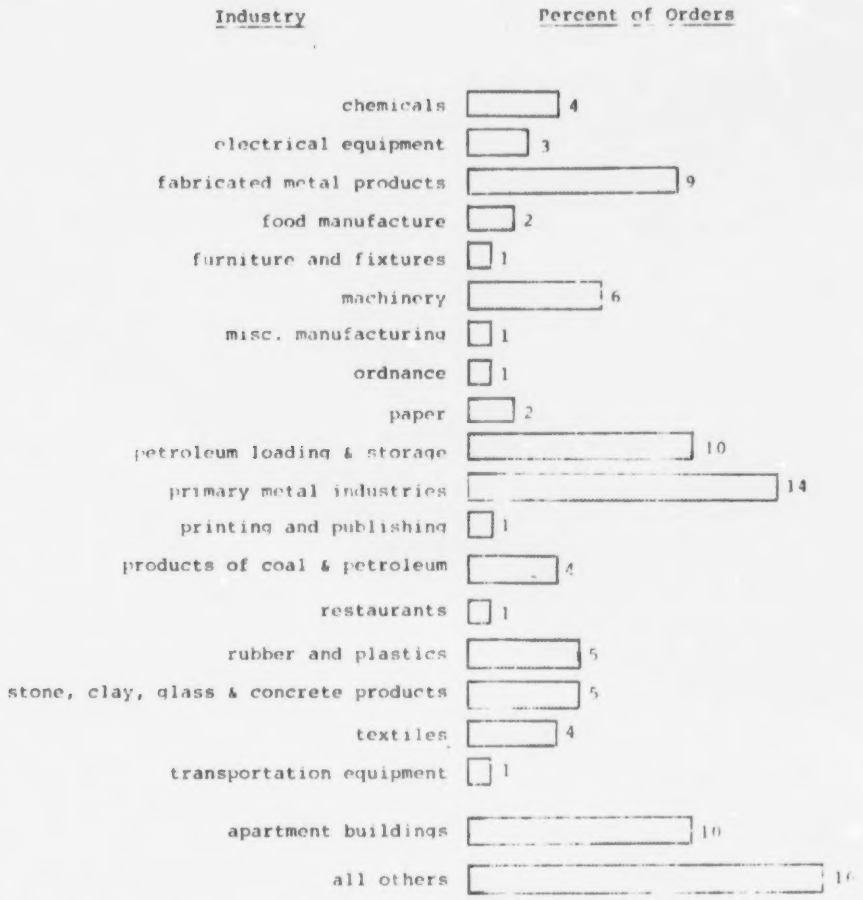
Allocation of Enforcement Control Center Staff Time by Class of Violation



Source: Time Logs maintained from 6/1/74 to 7/31/74.

DISCUSSION: The staff of the Enforcement Control Center is the element of the Air Compliance Unit responsible for the issuance and follow-up of notices of violation and of orders.

THE COMPANIES UNDER ORDER ALSO VARY GREATLY BY INDUSTRY[+].



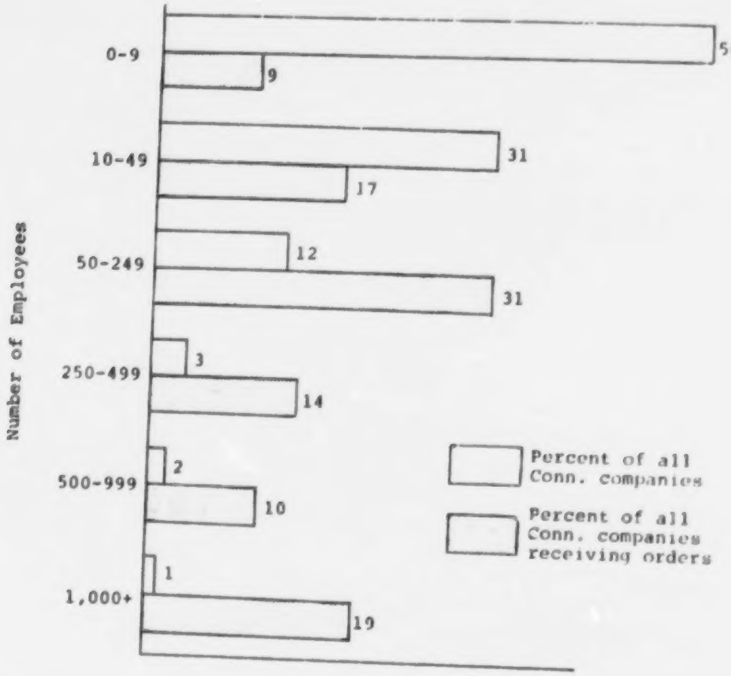
Source: DEP Air Compliance Unit Order files; *Connecticut Manufacturing Directory*, 1973.

[+] All 1971-1974 orders were classified by SIC.

Orders

ORDER RECIPIENTS ARE LIKELY TO BE RELATIVELY LARGE COMPANIES.

Distribution of Order Recipients by Size of Establishment



Source: Connecticut industry analysis is based on a random sample of Connecticut Manufacturing Directory, 1973. Air order listings include all orders completed or in process in July, 1974.

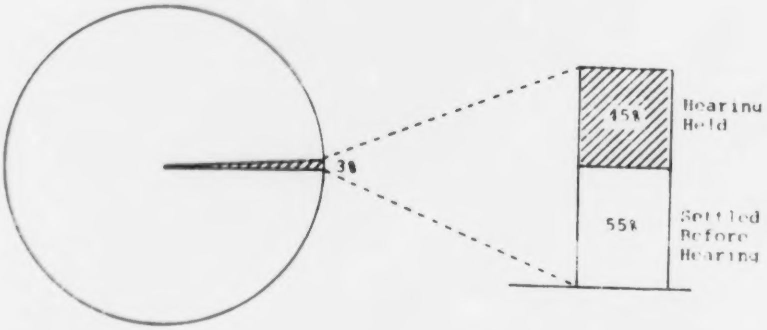
DISCUSSION: That order recipients tend to be relatively large establishments is not surprising. Small firms are likely to be in service industries or in other industries with low pollution potential. Moreover, if small firms do pollute, their problems are usually technically less complex than those of larger firms, especially those large firms with major capital investments. Consequently, small firms are more likely to be able to come into compliance promptly and not require the issuance of an order. Finally, the DEP naturally tends to allocate its limited staff resources to the most serious sources of pollution first.

Orders

A VIOLATOR WHO WISHES TO CHALLENGE THE REASONABLENESS OF HIS ORDER, OR WHO CLAIMS NO VIOLATION HAS OCCURRED, MAY CHALLENGE THE ORDER IN AN ADMINISTRATIVE HEARING.

BUT, AS OF NOVEMBER 1974, ONLY THREE PERCENT OF VIOLATORS WITH ORDERS HAVE ASKED FOR ORDER HEARINGS ...

... AND MOST OF THESE CASES WERE SETTLED BEFORE THE HEARING WAS HELD.

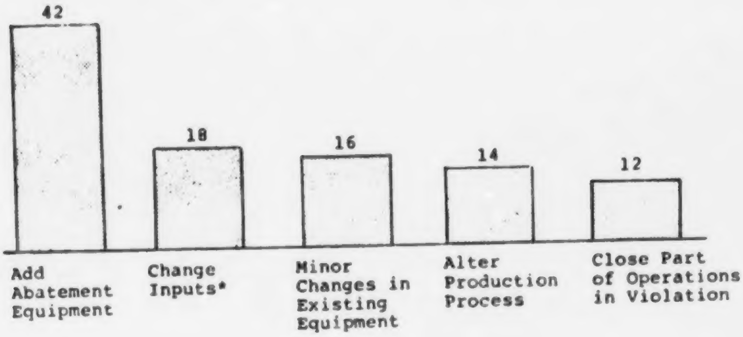


Source: "Monthly Report of Activities, Air Compliance Unit", December 1974; Air Compliance files.

DISCUSSION: That so few orders are challenged could be because the Department's orders are generally accepted as reasonable and/or regulatees are reluctant to undertake the expensive, time-consuming legislative fight, especially as long as they feel they can ignore the order or at least its compliance deadlines with relative impunity. The second of these factors has unquestionably been important. But the exceptionally low contest rate seems also to reflect the first factor significantly. In interviews the Air Complince Enforcement Unit staff uniformly stated that their objective was to establish a reasonable compliance schedule with the source -- and then to try to hold the source to this schedule. The Unit in fact expends considerable effort trying to get the source to propose its own schedule and to negotiate the order directly with the source based on the source's proposal. Until recently the Water Compliance Unit did not negotiate with the source prior to issuing its orders; and, although the engineers there also tried to establish reasonable orders, that Unit experienced a 14% request-for-hearing rate in its initial years and a 5% rate over the last several years. However, now that the Water Compliance staff negotiates with its sources, its rate of actual hearings has dropped to roughly the same level as that of the Air Unit.

MOST SOURCES ISSUED ORDERS COMPLY BY ADDING ABATEMENT EQUIPMENT.

Type of Corrective Action Taken by Persons Subject to Order
(in percent of all such persons)



Source: Random sample of Air Orders.

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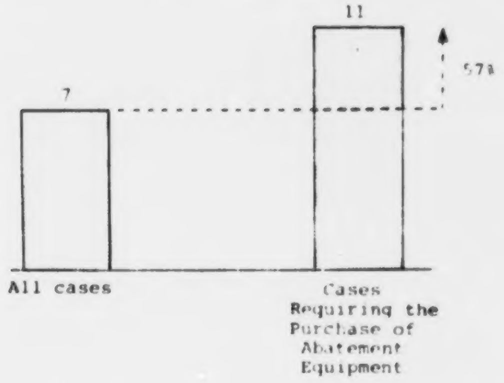
* For example: shifting to low sulfur fuel, changing solvents used.

VIOLATORS REQUIRED TO INSTALL EQUIPMENT ARE ALLOWED AN AVERAGE OF 52 PERCENT MORE TIME TO ACHIEVE COMPLIANCE THAN IS NORMALLY ALLOWED.

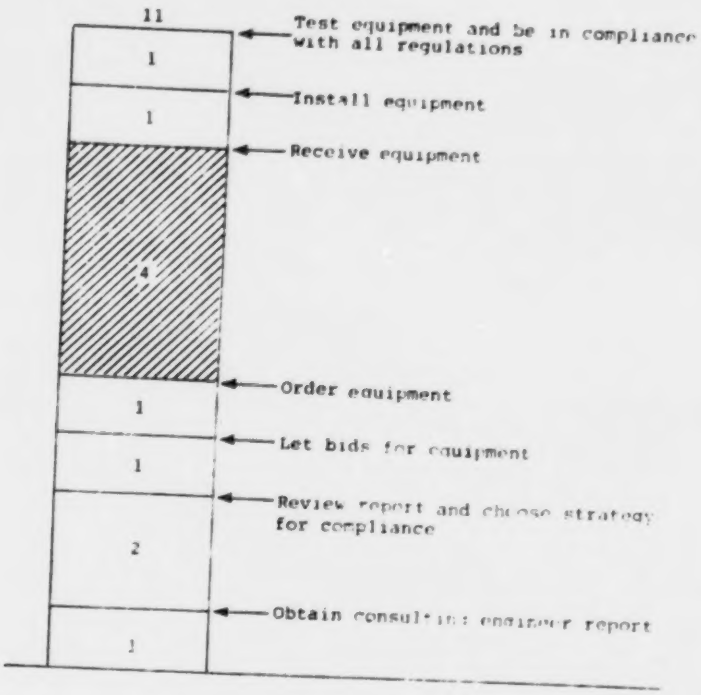
Average Order Schedule
(in months)



Source: Random sample of Air Orders.

THE GREATEST PART -- 36 PERCENT -- OF THE TIME ALLOWED IN ORDER COMPLIANCE SCHEDULES ISSUED TO SOURCES THAT MUST ADD CONTROL EQUIPMENT IS AN ALLOWANCE FOR OBTAINING DELIVERY OF THE EQUIPMENT.

Times Allowed for Completing Required Steps in the Average Compliance Timetable
(in months)



Source: Random sample of Air Orders.

DISCUSSION: Obtaining delivery of equipment is sometimes difficult for regulatees to control, especially during a period of rapidly expanding demand for pollution abatement equipment such as the early 1970's. However, regulatees have little incentive to exert the sort of effort they would in normal commercial dealings to insure prompt delivery. Early delivery only means early installation and operating and maintenance costs.

CHAPTER II

ORDER OVERRUNS

The following chapter details the problems the Department has had with delay, and explores the impact that these delays have had on DEP costs.

- 56% of order recipients overrun their compliance deadlines.
- However, only 23% of order recipients overrun their compliance deadlines by more than one month.
- Regulatees claim that most overruns--65%--are caused by third-party delays.
- 20% of regulatees with overruns claimed changes in their compliance plans as the primary reason for delay. In fact, however, such changes do not affect on-time performance.
- Progress reports are a key tool used by the DEP to police order delay. As of February, 1975, 17% of all required progress reports are either submitted over two weeks late or are not submitted at all.
- When regulatees overrun their compliance schedules, they do, so, on average, by 5.1 months, increasing the length of order timetables by 81%.
- Cases with compliance delay are also slower in negotiating their orders with the State than the average case.

Order Overruns

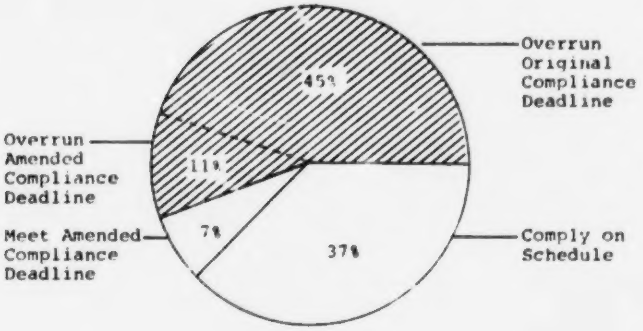
Continued

- Overruns are also significant for those who are ordered to purchase and install equipment. Overruns for these cases average 9 months, increasing order timetables by 81%.
- One effect of overruns is that over 40% of Enforcement Control Center time is spent policing delay.
- Cases that the Air Unit cannot prod into compliance by exerting moral pressure and legal threats are referred to the Attorney General. This procedure has been undertaken in 5% of orders issued to date.
- Because delay is difficult to discourage, the Department spends 63% more staff resources on recalcitrant cases than on those in which no delay occurs.

Order Overruns

56 PERCENT OF ALL ORDER RECIPIENTS ILLEGALLY OVERRUN THEIR COMPLIANCE DEADLINES.

Percent of All Orders Issued 1971-1974



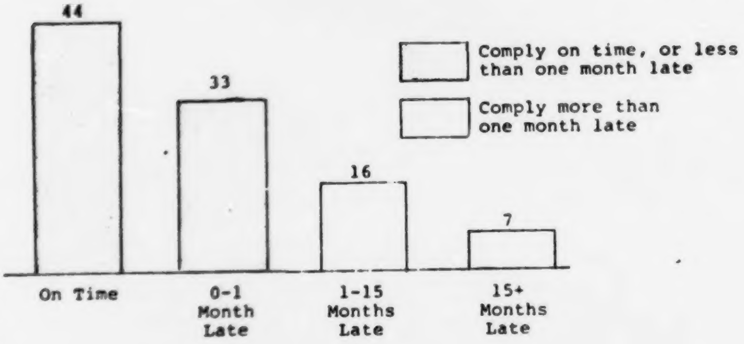
Source: Random sample of Air Orders, 1971-1974; Interviews with Air Compliance Unit staff.

DISCUSSION: Some delays, such as strikes or unavoidable suppliers' delays, are legitimate. Other delays occur for want of proper planning or motivation and could be avoided. This study does not distinguish between these two areas because such judgements are subjective and difficult to make. Some sources granted amendments could also have avoided compliance overruns. Amendments are sometimes granted in recognition that previous delay was unavoidable and sometimes to stimulate future activity from the violator, regardless of past history.

Order Overruns

MOST ORDERS WITH DELAY OVERRUN THEIR COMPLIANCE DEADLINES BY LESS THAN ONE MONTH. ONLY 23 PERCENT OF ALL ORDERS FAIL TO COMPLY WITHIN ONE MONTH OF AN ORIGINAL OR AMENDED DEADLINE.

Orders by Length of Overrun
(overruns as a percent of scheduled time)



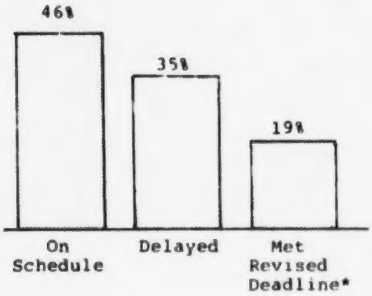
Source: Random sample of Air Orders, 1971-1974.

DISCUSSION: This compliance record is significantly superior to those of the Water Compliance and Water Resource Units. The average Water Compliance order is delayed over 15 months. Of 12 recent Water Resources encroachment line violations that have been issued orders to remove, none have been removed. In other words, the Air Compliance Enforcement Unit's approach of first negotiating an order that seems reasonable to the company and then paying close, persistent attention to the progress being made by the source under the order, has paid off.

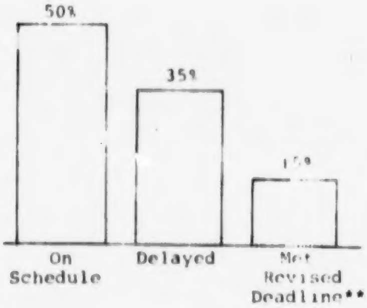
Order Overruns

20 PERCENT OF REGULATEES WITH OVERRUNS CLAIM CHANGES IN COMPLIANCE PLANS AS THE PRIMARY REASON FOR DELAY. YET THESE CHANGES DO NOT AFFECT ON-TIME PERFORMANCE.

OF THE 65 PERCENT OF ALL ORDER RECIPIENTS WHO FOLLOW THE COMPLIANCE PLANS SUGGESTED IN THEIR ORDER, 46 PERCENT COMPLY ON SCHEDULE.



OF THE 35 PERCENT OF ALL ORDER RECIPIENTS WHO CHANGE COMPLIANCE PLANS, 50 PERCENT COMPLY ON SCHEDULE.



Source: Random sample of Air Compliance Orders, 1971-1974.

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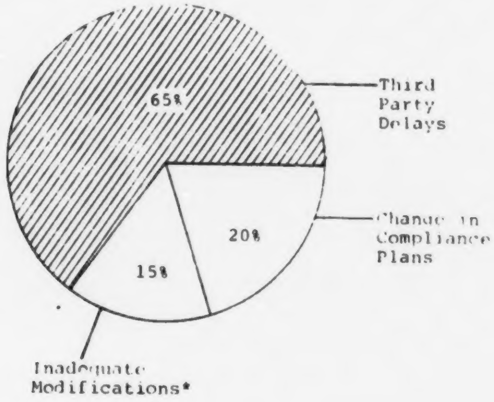
* Met amended order deadline, or granted extension.

** 58% of this group cited "change in compliance plans" as the reason for delay.

Order Overruns

REGULATEES CLAIM THAT MOST OVERRUNS -- 65 PERCENT -- ARE CAUSED BY THIRD-PARTY DELAYS.

Reasons Given by Regulatees for Overruns



Source: Random sample of Air Orders, 1971-1974.

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* Modifications made that were later found to be insufficient to achieve compliance.

DISCUSSION: Much third-party delay has been legitimate, especially during the last year or so when pollution control equipment manufacturers have had large backlogs. However, this excuse has also been an all-to-easy haven for companies not intent on prompt compliance -- and sources clearly have no economic incentive to press suppliers for early delivery. It is an easy excuse in large part because it is extremely difficult for the Department to verify such claims -- especially when dealing with the small hard-core of those actively and sometimes unscrupulously trying to avoid compliance. Companies that had previously experienced chronic "third-party delay" have demonstrated a remarkable ability to achieve prompt delivery from their suppliers once put under a bond they might lose if they fell behind schedule again.

SUPPLEMENTARY NOTE: PROGRESS REPORTS

One of the conditions of almost all orders is that the source will submit a monthly progress report to the Department summarizing its progress towards compliance over the last month. If the source is behind schedule, it must explain the salient details of the delay. This procedure allows the Enforcement Unit to pinpoint and react to developing problems quickly. It also saves the Department a great many expensive field inspections.

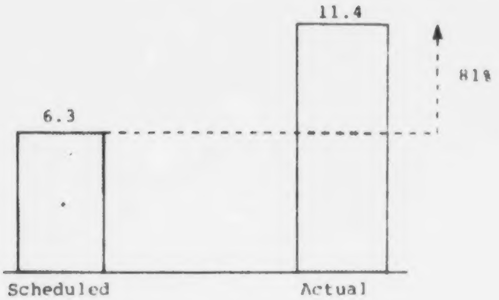
The success of this device depends entirely on the prompt and dependable submission of progress reports. The Enforcement Unit, at low cost, has been able to improve regulatees' records in this respect. As of July, 1974, 44% of all progress reports were missing or more than two weeks late. In January, 1975, only 17% of progress reports were missing or late.

But many of the most difficult violators continue to ignore this requirement. Of the 23 cases delayed most in 1974, 30% submitted at least two progress reports late or did not submit them at all.

Order Overruns

CASES WITH DELAY TYPICALLY OVERRUN THEIR COMPLIANCE DEADLINES BY 5.1 MONTHS (81 PERCENT OF SCHEDULED TIME).

Average Time from Order Issuance to Compliance
(in months)*



Source: Random sample of Air Compliance Orders, 1971-74.

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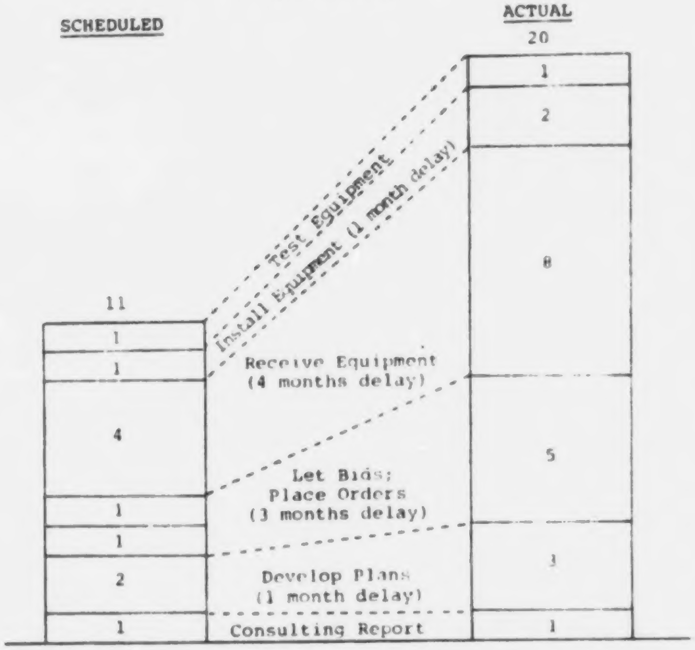
* Average overrun for all Air Compliance Orders, including those without delay, is 2.3 months, or 33% of the average scheduled time of 7 months.

Order Overruns

WHEN CASES REQUIRING ABATEMENT EQUIPMENT OVERRUN, COMPLIANCE IS TYPICALLY DELAYED FOR 9 MONTHS (81 PERCENT BEYOND SCHEDULED TIME).

Average Time from Order to Compliance
(in months)



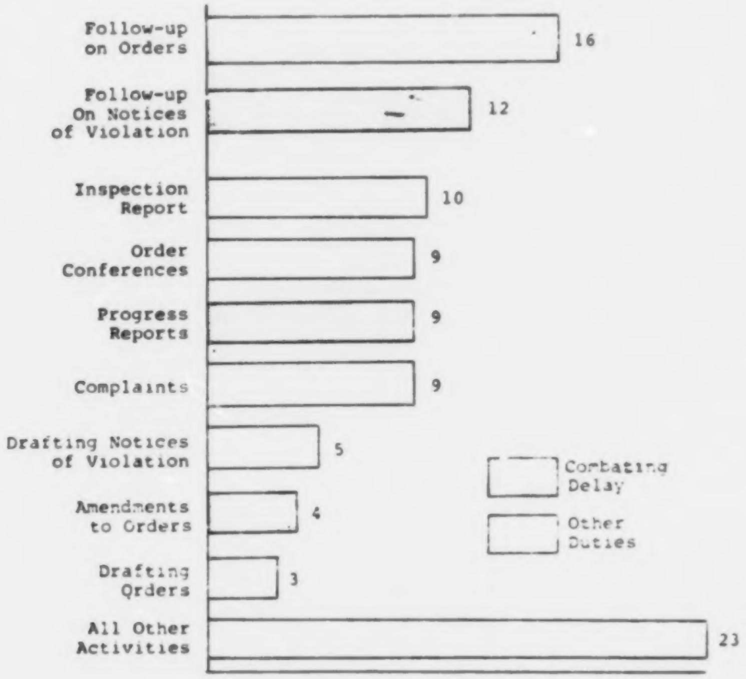
Source: Random sample of Air Orders, 1971-1974.

DISCUSSION: Although the longest absolute delay comes in the "receive equipment" step, the largest percentage overrun comes in placing the orders. This is understandable because this is the point at which the source must make its heaviest financial commitment.

Order Overruns

MORE THAN 40 PERCENT OF ENFORCEMENT CONTROL CENTER TIME IS SPENT TRYING TO REDUCE DELAY.

Allocation of ECC* Staff by Major Tasks
(percent of total EEC time)



Source: Time Logs maintained July 1974 to September 1974.

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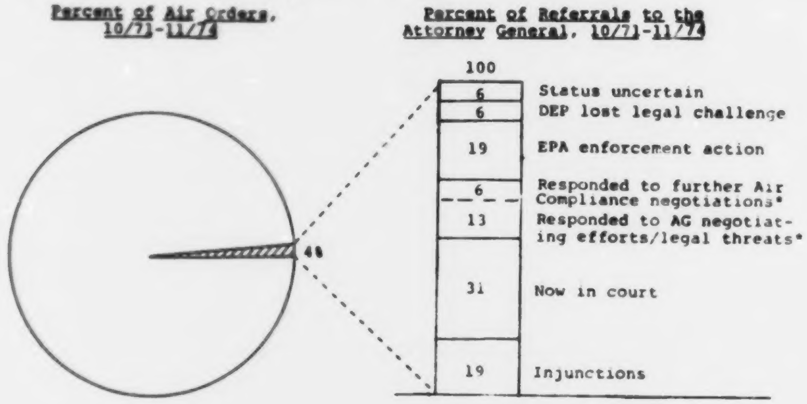
* ECC: Enforcement Control Center.

DISCUSSION: The Air Compliance Enforcement staff successfully limits delay by staying in close contact with the sources under order, especially once trouble develops. Monthly progress reports from the source let the Department learn quickly of the existence, extent, and cause of much delay. (They also keep reminding the source of a duty some managers would be quite content to put out of mind for a month or so.) "Follow-up" includes evaluating the problems the regulatee has encountered, deciding what response is appropriate, and communicating with the regulatee. Amendments are granted if the delay was for a legitimate cause and/or if the grant will encourage new efforts from the source. It is noteworthy that most of this enforcement time is spent on "follow-up" provisions, suggesting the importance of cajoling and moral suasion in stimulating further activity from the violator.

ONLY 4 PERCENT OF ALL ORDERS HAVE BEEN REFERRED TO THE ATTORNEY GENERAL FOR ENFORCEMENT.



Source: Air Compliance files.

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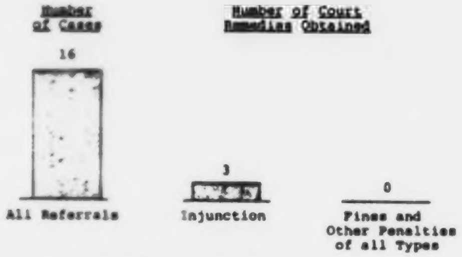
* Based on discussion of cases with Air Compliance staff.

IN ONLY THREE CASES HAS THE ATTORNEY GENERAL OBTAINED A COURT REMEDY.



Source: Air Compliance files.

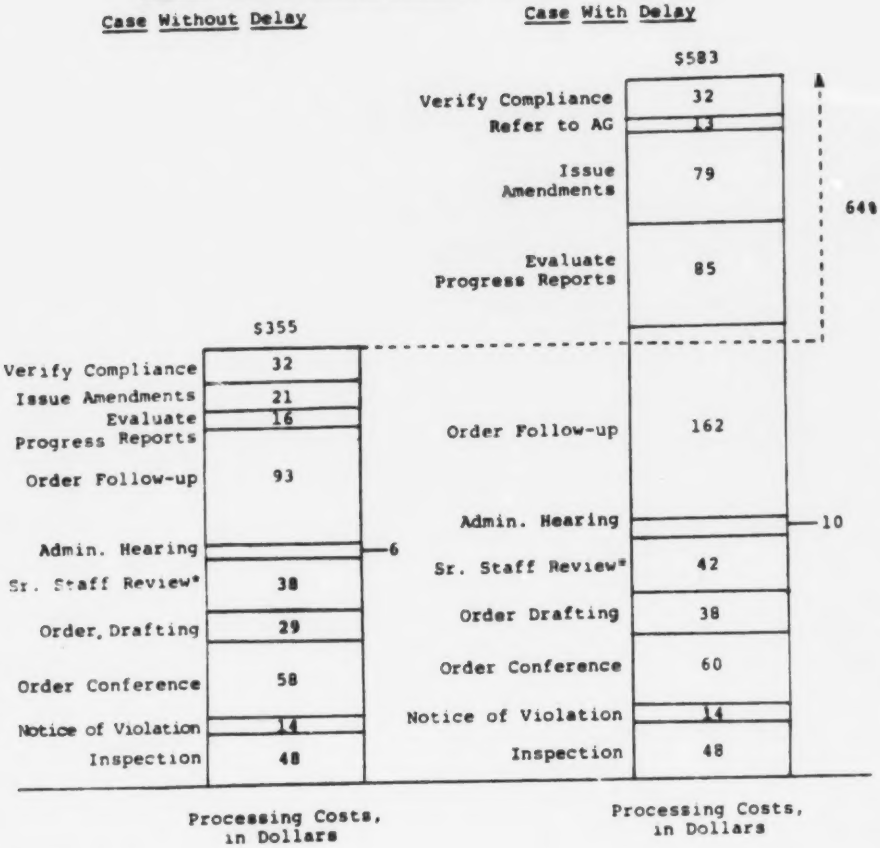
DISCUSSION: The low rate of referrals to the Attorney General is explained by (1) the usually good records of Air Compliance regulatees and (2) The perceptions of the Air Compliance staff that the utility of referral is low. The members of the Air Compliance Section refer cases only when they feel all benefit from negotiations has ended and that legal action is the only available recourse. This procedure has not led to results satisfactory to the Air Compliance staff: court proceedings are slow, cumbersome, and uncertain.

The AG attempts to avoid these delays and uncertainties by trying first to bluff and negotiate a satisfactory settlement before going to court. This is, however, a difficult task since (1) the cases referred have been referred because negotiations with the State have already broken down and (2) the AG has no additional leverage he can bring to bear on the recalcitrant source save the threat to go to court. And, on the record, such a threat is unlikely to greatly impress such sources.

Order Overruns

THE COSTS OF DELAY TO THE DEPARTMENT ARE ENORMOUS. A CASE WHICH DELAYS COMPLIANCE COSTS THE DEP 64 PERCENT MORE THAN A CASE WHICH COMPLIES WITH AN ORIGINAL OR AMENDED DEADLINE.

Average per Case Costs to DEP of Handling Cases Under Orders Issued between October, 1971 and July, 1974



Source: Time logs maintained from July 1 to August 31, 1974; interviews with Air Compliance staff. Calculations of costs with and without delay assume that the costs of a step increase proportionately with the time needed for that step. Since DEP costs mount less quickly before a source has encountered delay than after it has missed one or more deadlines, this approach probably greatly underestimates the cost of delay.

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* "Senior Staff Review" includes review by the Director of Air Compliance, legal counsel, and top DEP staff.

CHAPTER III

DEALING WITH THE MOST DIFFICULT CASES

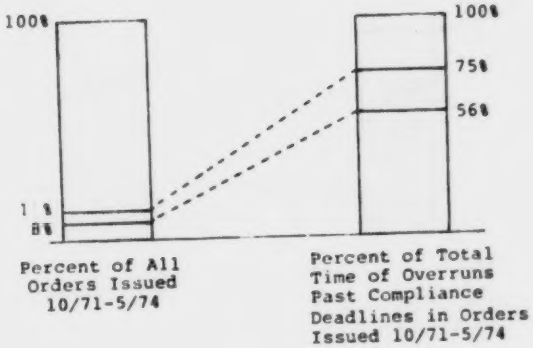
A small number of cases account for the bulk of the Department's enforcement problems.

- 8% of all orders account for 56% of all delay.
- The industrial distribution of these 8% worst cases is not strikingly different from that of all air orders issued.
- These worst cases are relatively evenly distributed by size of source under order.
- The worst 8% overrun their compliance deadlines by an average of 18.4 months.
- The worst cases typically require 6.9 months to agree to an order -- 64% more than those sources that comply on time.
- These most difficult cases typically cost 74% more in staff resources than an average case.
- On average they cost 135% more than do cases in which no delay occurs.

Most Difficult Cases

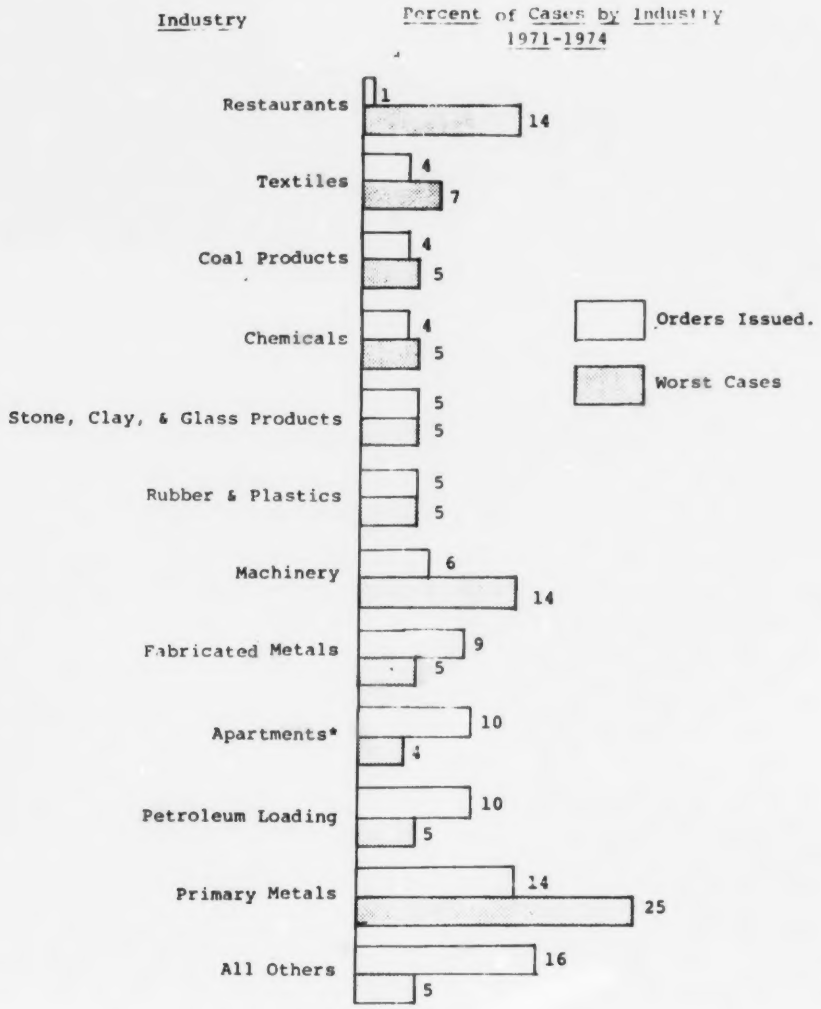
8 PERCENT OF ALL ORDERS ISSUED ACCOUNT FOR 56 PERCENT OF ALL DELAY; 13 PERCENT FOR 75 PERCENT.

Concentration of Delay



Source: DEP Air Compliance Enforcement Unit files. Distribution of delay in difficult cases was compared to an estimate of total delay obtained from a random sample of Air Orders issued 10/71-5/74.

THE DISTRIBUTION OF WORST CASES BY INDUSTRY IS NOT GREATLY DIFFERENT FROM THAT OF ALL ORDER RECIPIENTS.



Source: Random sample of Air Compliance orders issued 1971-1974; Connecticut Manufacturing Directory, 1973.

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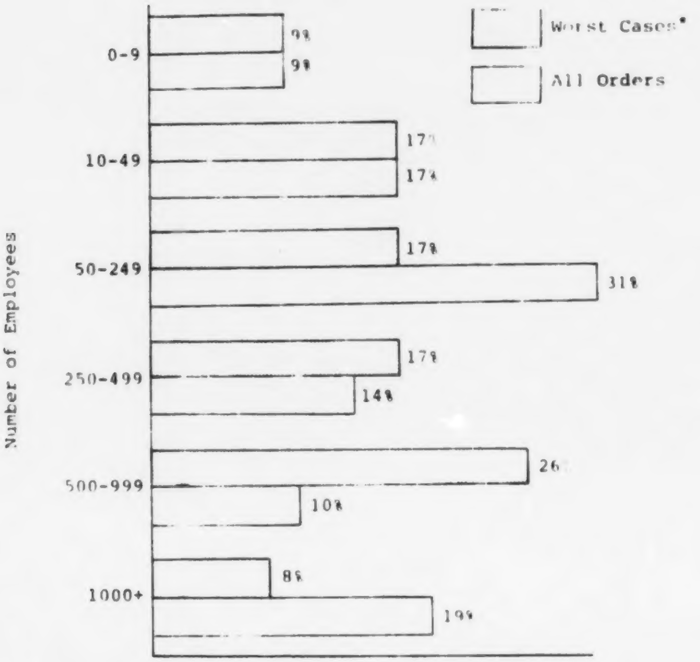
* Seven apartment houses in Stamford have overrun their compliance deadlines sufficiently to qualify as "worst cases". They have been treated here as one case. They claim that they are prevented from achieving compliance by the City of Stamford's refusal to pick up compacted waste, and have jointly hired a lawyer to represent them.

Most Difficult Cases

THE DISTRIBUTION OF WORST-CASE SOURCES BY SIZE IS NOT SIGNIFICANTLY DIFFERENT FROM THAT OF ALL ORDER RECIPIENTS.

Distribution of Order Recipients by Size



Source: Connecticut Manufacturing Directory, 1973; Random sample of DEP Air Compliance orders, 1971-1974.

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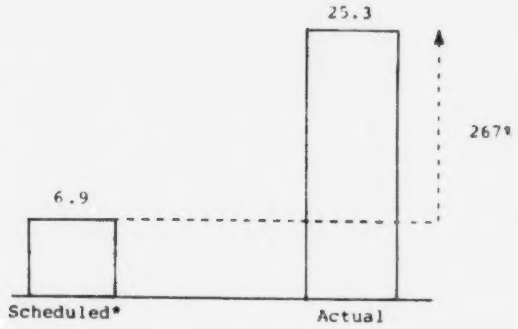
* All seven apartment buildings have been treated as one case, for reasons explained on the previous page.

Most Difficult Cases

THE WORST 8 PERCENT OF ALL CASES OVERRUN THEIR COMPLIANCE DEADLINES BY AN AVERAGE OF 18.4 MONTHS (INCREASING THEIR ORDER TIMETABLES BY 267 PERCENT).

Average Time From Order Issuance to Compliance
(in months)



Source: Air Compliance files.

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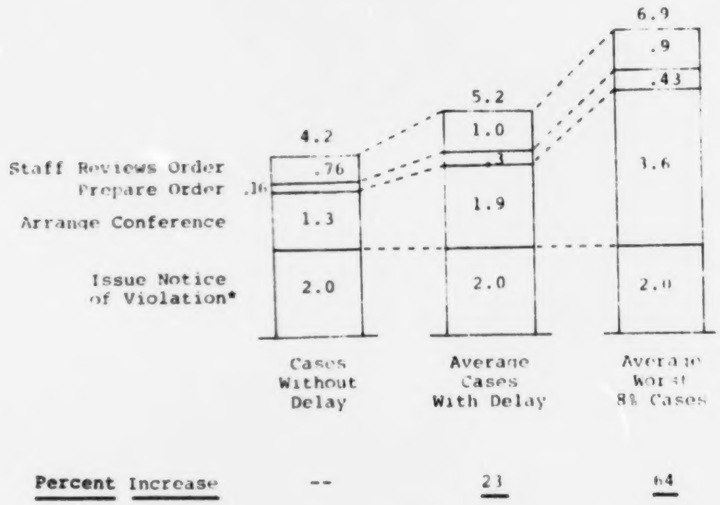
* Scheduled time for these sources is 1.4% less than the 7 months allowed on average.

Most Difficult Cases

THE WORST CASE SOURCES TYPICALLY REQUIRE 6.9 MONTHS TO AGREE TO AN ORDER -- 64 PERCENT MORE THAN THOSE SOURCES THAT COMPLY ON TIME.

Average Time from Detection to Order Issuance
(in months)



Source: Random sample of Air Compliance orders, 1971-1974.

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* No data was available on differences in the time interval between detection and notice of violation issuance for these kinds of cases. This step includes a one month interval for the issuance of the notice of violation and a one month "grace period".

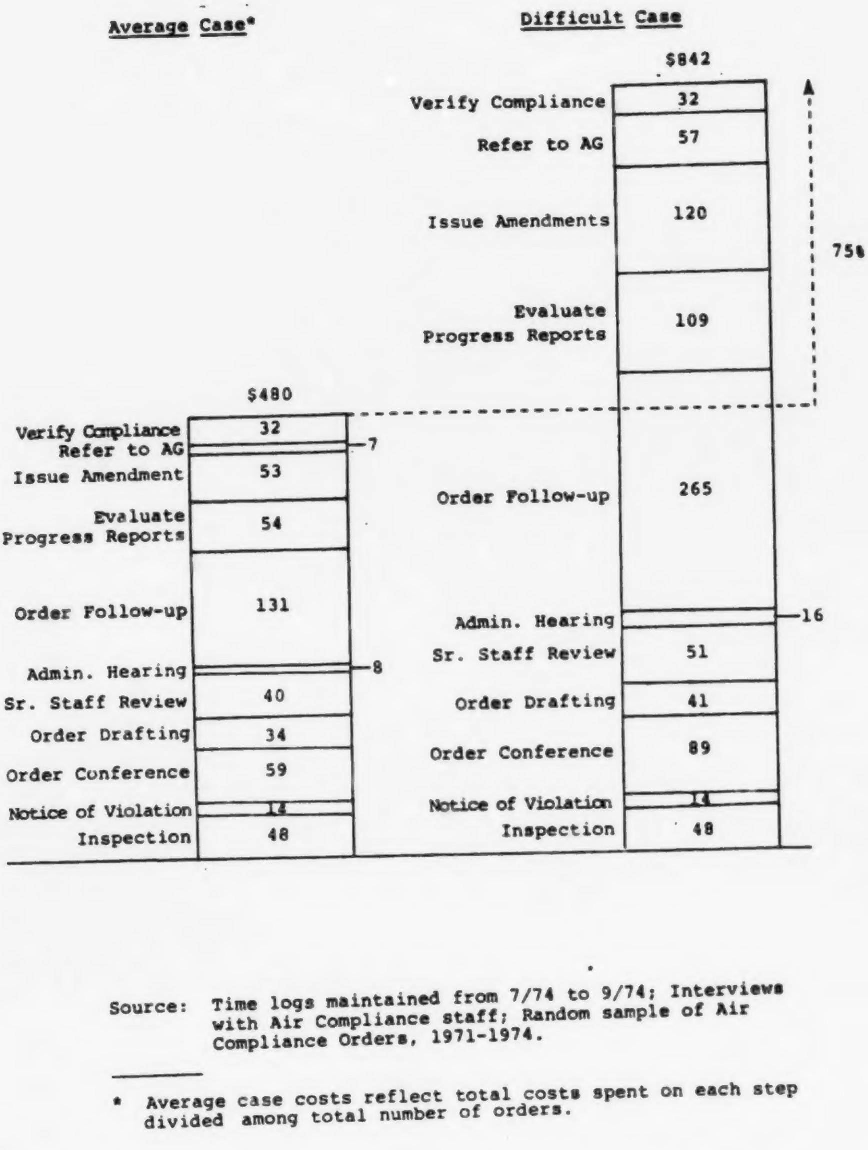
DISCUSSION: The worst cases take more time at virtually every stage of the pre-order period than do other cases. This pattern is especially noticeable in the interval before a conference is held, the "arrange conference" step. Cases with delay require .6 month more time at this stage than do cases without delay, an increase of 46%. The most difficult cases require much more time than do even those cases with delay -- 1.7 months, or an 89% increase.

This early pattern of delay, when third-party difficulties are clearly not a factor, provides strong support for the perception of the enforcement staff that these cases do not comply promptly as a matter of choice. A company reluctant to install expensive compliance equipment is also likely to be slow to come to a conference in which it is expected to commit itself to a binding order timetable.

Most Difficult Cases

THE WORST CASES EACH COST AN AVERAGE OF 75 PERCENT MORE IN STAFF RESOURCES THAN THE AVERAGE CASE.

Per Case Administrative Costs to DEP



Source: Time logs maintained from 7/74 to 9/74; Interviews with Air Compliance staff; Random sample of Air Compliance Orders, 1971-1974.

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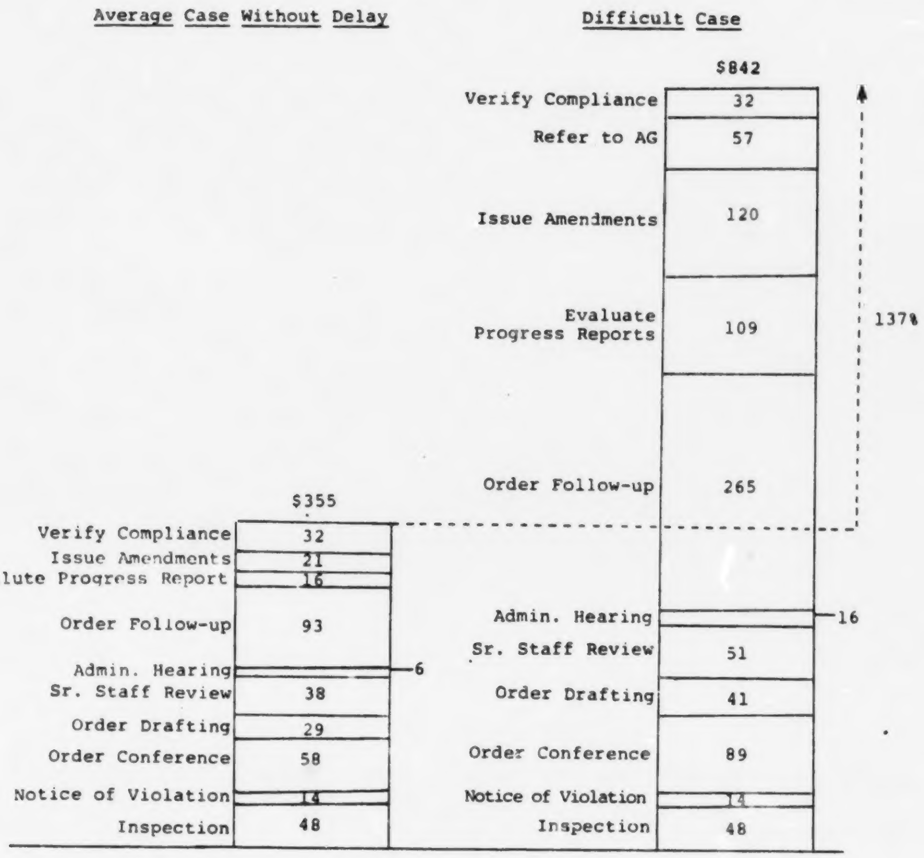
* Average case costs reflect total costs spent on each step divided among total number of orders.

Most Difficult Cases

AND THESE CASES HAVE COST THE DEP 137 PERCENT MORE THAN DO CASES IN WHICH NO DELAY OCCURS.

Per Case Administrative Costs to DEP



Source: Time logs maintained from 7/74-9/74; Interviews with Air Compliance staff.

CONCLUSION

The baseline shows about two-thirds of all sources inspected are currently in compliance and that the great majority not in compliance can and do correct their violations quickly and effectively. The Department's twin enforcement devices, the notice of violation and the state order, provide adequate enforcement in the great majority of cases.

As in other enforcement settings, however, a small group of violators poses inordinate burdens on the enforcement agency. As important, their ability to delay or avoid compliance undercuts voluntary cooperation by others and holds back the gradual environmental improvement sought by the Department.

Over half of the sources issued orders experience some delay in meeting compliance deadlines. Of this half, 8% incur delays that average over 1.3 years per case. This handful of sources is distinguished neither by type of industry nor by size of operation. They are marked, however, by their ability to delay compliance, despite vigorous and expensive efforts by the Department.

The new enforcement tools developed by the Connecticut Enforcement Project and the Department are designed to give the Department the tools it needs to deal effectively with this recalcitrant minority.

APPENDIX: RANDOM SAMPLE OF AIR ORDERS

The information used in these analyses is based on a random sample of Air Compliance orders. All data was taken from the form "Check List for Orders." The orders actually included in this sample are listed below by company name:

A.G.I*
American Chemical & Refining
American Standard
American Wire
Art Metal
Barnum Hotel*
Berol Co.
Borg Textiles
Bridgeport Brass
Bryant Electric
Bullard*
Capital Tire
Carpenter Technology
Chase Brass & Copper
Cities Service Oil
Columbia Magnetics
Commercial Foundaries*
Conn. Galvanizing
Diversified Industries*
D. M. Reed, Inc.
E. I. duPont
Elco Industry, Inc.
Eyelet Specialty
Fabric Fire Hose*
Fairmont Corp.
Feldspar
Fern Apts.
Fleming Rutledge Oil
Gade Farm*
General Dynamics
Greenbacker-Schwink
Guilford Gravure
Hartford Finance
Hoffman Fuel
Hoyt Bedford Apts.
Hudson*
IdleWild Farm
Independent Oil
Keratene
King's Dept. Store
Knights of Columbus Printing Plant*

Lorraine Industries
Meriden Foundary
Natural Can *
North-Judd Manufacturing
O.F. Mossberg
Peckham Materials
Phizer, Inc.*
Plainville Casting*
Pioneer Metal Products
Porce-Len, Inc.
Rocco Becce Pig Farm
Rostand Mfg.
Scoville*
Shell Oil
Sommers Thin Strip Brass*
Suisman and Blumenthal
Sun Chief Electrics
Sun Oil Co.
Technical Rubber*
Thames Valley Steel*
United Illuminating
Upjohn
Vulcan Radiator*
Wiremold Co.
Wm. Prym. Co.*

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* These orders form the basis for (and were used only for) the charts found on pp. II-16 and II-43.

PART III

CALCULATING ECONOMIC REMEDIES

CHAPTER I

CALCULATING ASSESSMENTS

Economic remedies must be just large enough to make compliance economically attractive: they must take away the entire benefit of noncompliance -- including whatever return the noncomplying person may be able to earn on the use of the money it has not spent on pollution control for however long the delay continues. Such economic assessments should ensure voluntary compliance because they simultaneously remove the incentive to delay and guarantee those who do comply a commercially attractive "return" on their abatement investments -- not having to pay the assessments. This "return" will be sufficiently attractive to make citizens feel that compliance "pays" because it is calculated at the cost of capital rate appropriate for each source, i.e. because it is as large as the returns the source is obtaining on investments it has recently chosen to make.

An economic assessment is defined to be that payment which would, if made at the end of each month throughout a specified assessment period, have the same net economic impact on a company as the expenditures necessary for compliance with Department requirements throughout that assessment period. In other words, the present value of the stream of assessment payments made over the assessment period would equal the present value of the net flow of compliance costs over the same period.

Economic assessments are based on a simple economic calculus that is commonly used by businessmen in evaluating investment alternatives. This calculus requires four main steps:

(1) Identify the gross cash flow of all expenditures necessary for the source to comply with the law during each year of the assessment period and adjust for anticipated inflation (deflation). Both initial and replacement installed capital costs and operating and maintenance expenses must be considered.

(2) Obtain net cash flow by adjusting the figures in (1) for the effect of tax deductions and credits, chiefly for depreciation of capital equipment and for operating and maintenance expenses.

(3) Discount this net cash flow to a present value (using a cost of capital rate if the source is a business).

(4) Calculate the final civil assessment as that amount which would, if paid monthly over the assessment period, create a stream of payments whose present value (using the same discount rate as in (3)) would equal the present value of the cost of compliance.

The rest of this chapter outlines this methodology in greater detail. It explains what information is needed, how this information must be adjusted to take the impact of taxes into account, how the calculations are handled by the assessment formula, and how this formula is derived. It then explains how this formula was used to establish the schedules of maximum civil assessments found in the regulations, and, finally, it briefly explains how it is used to calculate individual assessments.

DETERMINING THE COSTS OF COMPLIANCE CASH FLOW

The first step in determining the proper amount of an economic assessment is to identify what costs will be incurred in each year of the period during which control activities can be presumed to continue. (How these costs are determined, the most difficult step in making individual assessments, is explained briefly in Chapter II of this Part and, in detail, in Chapter VII of Part V.) These costs, and how they will be handled in the assessment formula, are outlined below briefly:

(1) Initial capital costs for pollution control equipment facilities considered as an expenditure in year zero.

(2) Replacement costs for this abatement equipment. It is assumed that the equipment will be replaced at the end of each depreciation period within the assessment period and that the cash outlay is increased (decreased) by the average of the inflation (deflation) experienced over the three years prior to the date of the assessment. (The assessment period is 20 years for reasons discussed below; in individual assessment cases the depreciation period is presumed to be 10 years unless the Commissioner finds otherwise. The 10 year figure is based on a CEP survey of the typical life expectancy of commonly used air pollution control equipment.)

(3) The salvage value of any equipment to the extent that it is not fully depreciated at the end of the assessment period. This factor is, of course, a credit that reduces the net cost. Salvage value is also adjusted for inflation (deflation).

(4) Annual operating and maintenance costs, i.e. such costs as are required to ensure the continuous effective operation of the pollution abatement equipment over its full depreciable life. These costs are increased (decreased) each year to account for inflation (deflation).

All of these expenses are affected importantly by the impact of various tax provisions. The assessment formula must consider the effects on a source's U. S. income tax of:

(1) An investment tax credit for the purchase of new abatement equipment.

(2) The ability to deduct from taxable income each year

  (a) Depreciation on the capital cost of equipment over its useful life (or at accelerated rates approved for such equipment), and

  (b) Annual costs of operation.

In developing assessments from the net cash flow of the costs of compliance created from these cost estimates and tax considerations, the following assumptions apply:

- Tax savings are calculated as if the violator is in a tax bracket with a known effective rate (the variable T in the assessment formula) in all years.
- Regulatees either have or will have sufficient taxable income to take full advantage of any tax credits or deductions to which they are entitled by virtue of required control expenditures, or their effective U. S. income tax rate (T) will be 0. (See Chapter 5.)
- An investment tax credit is in effect, and is obtained at the time equipment is purchased.
- For purposes of discounting, operating costs are considered to be paid and corresponding tax savings realized at the beginning of each year. Tax savings from depreciation are realized at the end of each year.

- * If equipment is not fully depreciated at the end of the assessment period, it can be sold at a salvage value equal to its economic worth. In that case a portion of the tax credit must be refunded, pro-rated according to the proportion of useful life remaining. (The formula for salvage value is given in the derivations section below.)

- * For all purposes other than calculating the depreciation tax deduction, where realistically accelerated depreciation in case by case assessment is used, straight-line depreciation is used.

THE ASSESSMENT FORMULA

Department staff do not have to push their way through the host of calculations required to set out the costs of compliance cash flow, adjust it for tax and inflation, discount to present value, etc. All these calculations are handled automatically by the assessment formula. All the staff need do is put a tape casette with the formula into a desk calculator and type in a few variables and all this work will be done in seconds.

This section explains the formula and its derivation.

Notation

Input variables:

AP = Assessment period in years.

CC = Annual cost of capital or discount rate, as a decimal fraction.

EL = Expected life of equipment, in years.

DL = Depreciable life of equipment, in years.

CCE = Capital cost of equipment for initial equipment, in dollars.

OP = Operating costs in the first year, in dollars.

RI = Annual rate of inflation, as a decimal fraction.

T = Effective marginal corporate income tax rate, as a decimal fraction. (If there is a state corporate income tax, T would be the total effective tax rate. It would be given by the formula:

$T = T_s + (1 - T_s)\ T_f$, where T_s is the state corporate income tax rate and T_f the federal one).

TC = Investment tax credit rate, as a decimal fraction.

Output variable:

CA = Civil assessment per month, in dollars.

Other variables:

PVO = Net present value of operating costs over assessment period, net of any tax savings arising from operating costs.

PVIE = Net present value of initial equipment, net of any tax credits and savings arising from the purchase and depreciation of this equipment.

PVE = Net present value of equipment cost over entire assessment period. (Includes discounted value of initial and replacement equipment, less the value of tax credits and deductions and of any salvage value at the end of the assessment period.)

A = Amortization factor, giving amount of monthly payment required per dollar of present value to be amortized.

Formula

The civil assessment is given by formula (1) below, with the additional variables defined by equations (2) through (5). (These formulae are derived in the following section.)

$$CA = (PVO + PVE)\ A \qquad (1)$$

$$PVO = (1-T)\left(\frac{1 + CC}{CC - RI}\right)\left(1 - \left(\frac{1 + RI}{1 + CC}\right)^{AP}\right) OP \qquad (2)$$

$$PVIE = \left[(1-TC) - \frac{T}{(DL)(CC)}\left(1 - \frac{1}{(1 + CC)^{DL}}\right)\right] CCE \qquad (3)$$

$$PVE = \left[\frac{1 - \left(\frac{1 + RI}{1 + CC}\right)^{AP}}{1 - \left(\frac{1 + RI}{1 + CC}\right)^{EL}}\right] PVIE \qquad (4)$$

$$A = \frac{(1 + CC)^{(1/12)} - 1}{1 - \frac{1}{(1 + CC)^{AP}}} \qquad (5)$$

Derivations

CA:

The total present value of compliance costs is the sum of PVO and PVE. The economic assessment is the monthly payment which amortizes this sum over AP years. Hence, the sum is multiplied by the amortization factor A.

PVO:

We assume that operating costs are paid in the beginning of the year. Each year operating costs increase by an inflation factor of (1 + RI), regardless of the age of equipment then in use. We convert operating costs for year I to present value by discounting by the factor $1/(1 + CC)^{I-1}$. Assuming T is the current maximum rate of .48, there is a tax savings of 48 percent of operating costs each year, so net operating costs are .52 of gross operating costs each year. In general,

$$PVO = \sum_{I=1}^{AP} \left[(1 - T)(OP)(1 + RI)^{I-1} \right] \left[\frac{1}{(1 + CC)^{I-1}} \right]$$

Formula (2) above is an equivalent but explicit formula, derived from the sum of a geometric series.

PVIE:

The cost of initial equipment is CCE. Deducted from this is the tax credit (the variable TC) obtained immediately, and tax savings of the fraction T of allowable depreciation for each year of depreciable life of the equipment. Using straight-line depreciation, annual depreciation is CCE/DL. Depreciation in year I is discounted by the factor $1/(1 + CC)^{I}$. Thus

$$PVIE = CCE - (TC)(CCE) - \sum_{I=1}^{DL} T \left(\frac{CCE}{EL} \right) \frac{1}{(1 + CC)^{I}}$$

Formula (3) above is equivalent.

PVE:

The equipment cost of the K^{th} set of replacement equipment (where K = 0 for initial equipment) is equal to the purchase price of the initial equipment times a cumulative inflation factor of $(1 + RI)^{K \times EL}$.

The savings due to the tax credit on replacement equipment and to deductions for depreciation are proportional to equipment cost, and are thus also inflated by the same cumulative inflation factor. Note that all expenditures and savings on this piece of replacement equipment occur (EL) x (K) years further in the future than the corresponding cash flows for the initial equipment purchase. Provided that the entire useful life of the K^{th} replacement equipment lies within the assessment period, its contribution to net present value is

$$\left(\frac{1 + RI}{1 + CC}\right)^{(EL)(K)} \quad \left(PVIE\right)$$

If the assessment period AP is an integral multiple of the equipment life EL, then the useful life of all replacement equipment will be within the assessment period. In that case,

$$PVE = \sum_{K=0}^{(AP/EL)-1} \left(\frac{1 + RI}{1 + CC}\right)^{(EL)(K)} \quad \left(PVIE\right)$$

Formula (4) is equivalent but simpler.

If AP is not an integral multiple of EL, then the last piece of replacement equipment still has a salvage value at the end of the assessment period. We assume that the salvage value is equal to the economic value of the equipment, which is the present value of remaining "services" of this equipment plus the tax savings from any remaining allowable depreciation. If the equipment was purchased in year J and has a remaining lifetime of I years (where I is less than EL) its salvage value is

$$CCE\ (1 + RI)^{J} \left[\left(\frac{1- \left(\frac{1 + RI}{1 + CC}\right)^{I}}{1- \left(\frac{1 + RI}{1 + CC}\right)^{EL}} \right) (1-TC) + \frac{I}{EL}\ (TC) \right]$$

This salvage value is such that the net present value of equipment costs over any period does not depend on what combination of new and used equipment is owned during that period. As a result, equation (4) for PVE holds regardless of whether AP is an integral multiple of EL.

A:

The amortization factor is based on the standard formula for a monthly annuity of unit amount for AP years at an annual interest rate of CC. Since the formula is for monthly payments, the numerator is the monthly cost of capital.

DETERMINING MAXIMUM ASSESSMENTS

For purposes of calculating maximum assessments, we assume the following values: (Note that CA increases with increases in DL, CCE, OP, RI, CC AND AP, and decreases with increases in EL, T and TC).

- * RI = .15 (i.e., 15%). The typical rate of inflation has increased markedly over the last several decades and reached levels not far from 15 percent in 1974.

- * CC = .20 (i.e., 20%). Over the long run, the cost of capital has generally exceeded the inflation rate by about 5 percent to provide an adequate return and to compensate investors for inflation.

- * AP = 20 years. Twenty years is a common time frame for evaluating many capital projects. Since abatement equipment is an auxiliary to production facilities, such equipment or replacements will have to be used for the lifetime of the underlying plant requiring control, if the source is to remain in compliance with the law. Consequently it is reasonable to assume that sources evaluating a commitment to abatement will think in terms of the common 20-year period. Moreover, a common assessment period helps ensure that assessments are comparable and therefore fair.

- * EL = 5 years. Very few significant types of air pollution control equipment have useful lives less than five years long.

- * DL = 5 years. Federal tax law permits that pollution abatement equipment be depreciated over a five-year period, or over the expected lifetime of the equipment, whichever is shorter.

- * T = .48 (i.e., 48%). Although a zero tax rate is possible, and assuming a rate lower than the maximum corporate rate could be defended easily and would increase the assessment maximum significantly, the schedule of maxima used in §§602 and 603 assumes the 48 percent rate because it is the rate likely to apply in all but a small minority of cases in which assessments are likely.

- * TC = .07 (i.e., 7%). This is the current rate of the U. S. investment tax credit.

- * CCE, OP - maximum figure in range. To obtain the maximum assessment when CCE and OP may assume any value over a specified range, CCE and OP are set at the upper limits of their respective ranges.

An Example: Derivation of a Maximum Assessment

The following computations illustrate the calculation of the civil assessment for the upper left cell in Schedule A of §602(d) of the Air Compliance Civil Assessment Regulations. (This cell is for cases with cost of equipment, CCE=$2500 and annual operating cost, OP=$1000. Other input variables are set at the values specified above.)

$$\text{PVO} = .52 \left(\frac{1 + .20}{.20 - .15}\right) \left(1 - \left(\frac{1 + .15}{1 + .20}\right)^{20}\right) 1000 = 7152.23 \quad \left[\text{by } (2)\right]$$

$$\text{PVIE} = \left[.93 - \frac{.48}{5(.20)} \left(1 - \frac{1}{(1 + .20)^{5}}\right)\right] 2500 = 1607.25 \quad \left[\text{by } (3)\right]$$

$$\text{PVE} = \left[\frac{1 - \left(\frac{1 + .15}{1 + .20}\right)^{20}}{1 - \left(\frac{1 + .15}{1 + .20}\right)^{5}}\right] (1607.25) = 4806.26 \quad \left[\text{by } (4)\right]$$

$$A = \frac{(1 + .20)^{(1/12)} - 1}{1 - \frac{1}{(1+20)^{20}}} = .015719 \quad \left[\text{by } (5)\right]$$

$$\text{CA} = (7152.23 + 4806.26)\ .015719 = 187.98 \quad \left[\text{by } (1)\right]$$

For this example the civil assessment would be $187.98 for each month in which the polluter failed to comply with emissions standards.

SETTING INDIVIDUAL ASSESSMENTS

Individual assessments are determined using the same economics and assessment formula as were used to fix the maximum assessment schedules. However, the Department will utilize current, real values for CCE, OP, EL, DL, RI, T, TC and CC.

* Equipment Costs (CCE) will be based on Department estimates of the installed equipment costs required to bring an uncontrolled source into compliance or on evidence of the actual cost. (See Chapter II.)

* Operating and Maintenance Expenses (OP) will be based on Department estimates of the annual cost of operating and maintaining this equipment properly. (See Chapter II.)

* Equipment Life (EL) is 10 years unless the Commissioner determines otherwise in a correction hearing. He will use reliable tables from, e.g. the U. S. EPA and/or IRS, in doing so.

* Depreciable Life (DL) is 5 years unless Federal tax law changes or unless the Commissioner determines that the lifetime of a particular piece of equipment (and therefore its depreciable life) is less than five years.

- The Rate of Inflation (Deflation)(RI) will be valued as an average of recent annual rates based on an appropriate price index. (See Chapter III.)

- The U. S. Income Tax Rate (T) applicable to the source will be assumed to be 48 percent if the source is a corporation (with very limited exceptions) and zero percent if it is a public body or a nonprofit institution. The rate will vary if the source is an individual or partnership. (See Chapter IV.)

- The Investment Tax Credit (TC) will be the rate set in the current tax law. (It is now 7 percent.)

- The Cost of Capital (CC) will be set in most cases as the marginal rate obtaining in the industry at the time. (See Chapter V.)

The following chapters explain how to estimate installed capital and annual O&M costs, how to adjust for inflation, how to take different individual tax rates into account, and how to obtain the cost of capital so critical to the formula.

CHAPTER II

ESTIMATING EQUIPMENT AND OPERATING COSTS

The most important variables in the assessment calculation are the installed equipment costs and the annual expense of operating and maintaining the equipment. To impose civil assessments at the appropriate level, the Department must be able to estimate what the equipment and operating costs for a source will be easily and accurately.

HOW THE COSTS OF COMPLIANCE ARE ESTIMATED

In roughly 88 percent of the Air Compliance Unit's enforcement cases, the costs of compliance can be estimated with the help of cost curves. These curves measure the relationship between one or two readily available facts, primarily the volume of air that must be treated and the type of pollutant involved, and the cost of the necessary control measures. Thus, for example, for any particulate emission, the control costs (for either a baghouse, a wet scrubber, or an electrostatic precipitator) can be related to the flue gas flow rate of the process emitting the particulates. With these curves available, all a Department staff member need do to obtain reliable cost estimates is to

- determine the key variables (flow, type of pollutant) necessary to use the curves;
- decide what control technique (baghouse, scrubber, etc.) is most likely to achieve compliance with the State's environmental standards;
- read the cost estimates off the appropriate cost curves.

The full set of curves that have been developed to date, along with a discussion of how they were derived and tested, and of how they should be used, follows in Chapter VII of Part V of this Volume.

Given the enormous variety of situations requiring control, there will inevitably be cases for which curves have not been developed. In these cases tests of Department staff indicate that estimates, accurate within 20 percent, can be obtained in one to sixteen hours a case. (See Chapter VII of Part V again) The fact that such estimates will be necessary for only a few percent (because most sources will not require assessments) of a small minority of all cases (because cost curves are available for the majority) makes the time required for making such case-by-case estimates an easily managed administrative cost.

An example will help clarify how cost curves would be used in most cases.

Using Cost Curves: An Example

Let's see what the Department would have to do to estimate the costs of compliance in the following case: a brass manufacturer who emits particulates from an uncontrolled reverbatory-type furnace used to melt zinc containing brass. From information furnished on the Department's registration form (or from an on-site inspection) a Department engineer determines that the process emission rate is 252 pounds per hour, and that the process weight rate is 7200 pounds per hour. He also determines that the currently installed hooding captures virtually all emitted particulates with the fan operating at 22,000 actual feet per minute (ACFM) during maximum loading conditions. Since the Department's regulations permit an emission rate of only 7.8 pounds per hour for a plant of this size, the brass manufacturer is in clear violation of the Department's regulations.

In comparing the magnitude of the process emission rate (252 pounds per hour) to the Department regulation allowing 7.8 pounds per hour, the Department engineer ascertains that compliance will require a control strategy with 97 percent efficiency. This required efficiency, coupled with an industry preference for the use of dry collection systems wherever possible, leads the engineer to choose a baghouse as the method of control for which he must develop cost estimates.

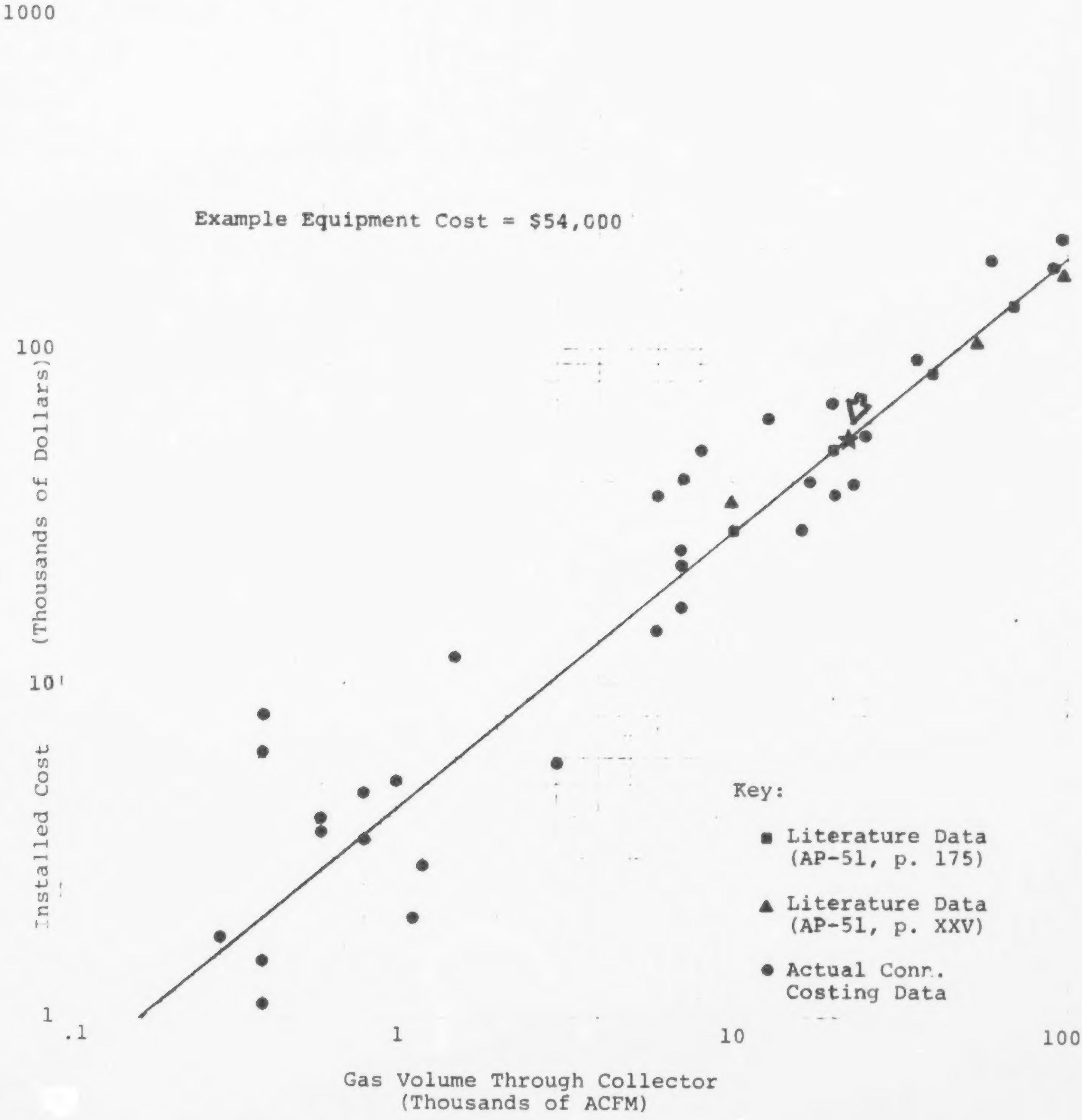
With this information about operating parameters and type of control equipment, the Department engineer turns to the appropriate costing curves developed and maintained by the Department. The relevant curves are reproduced below.

Since the gas volume flow rate to be controlled is 22,000 ACFM, the cost curves indicate that equipment costs for the baghouse will be $54,000 and that the annual operating costs will be $15,000.

The curves for equipment costs (CCE in the assessment formula) and operating and maintenance costs (OP) follow:

Installed Cost Of Baghouses

-Particulate Control-



Example Equipment Cost = $54,000

Figure 3

Annual Operating & Maintenance Cost Of Baghouses

-Particulate Control-

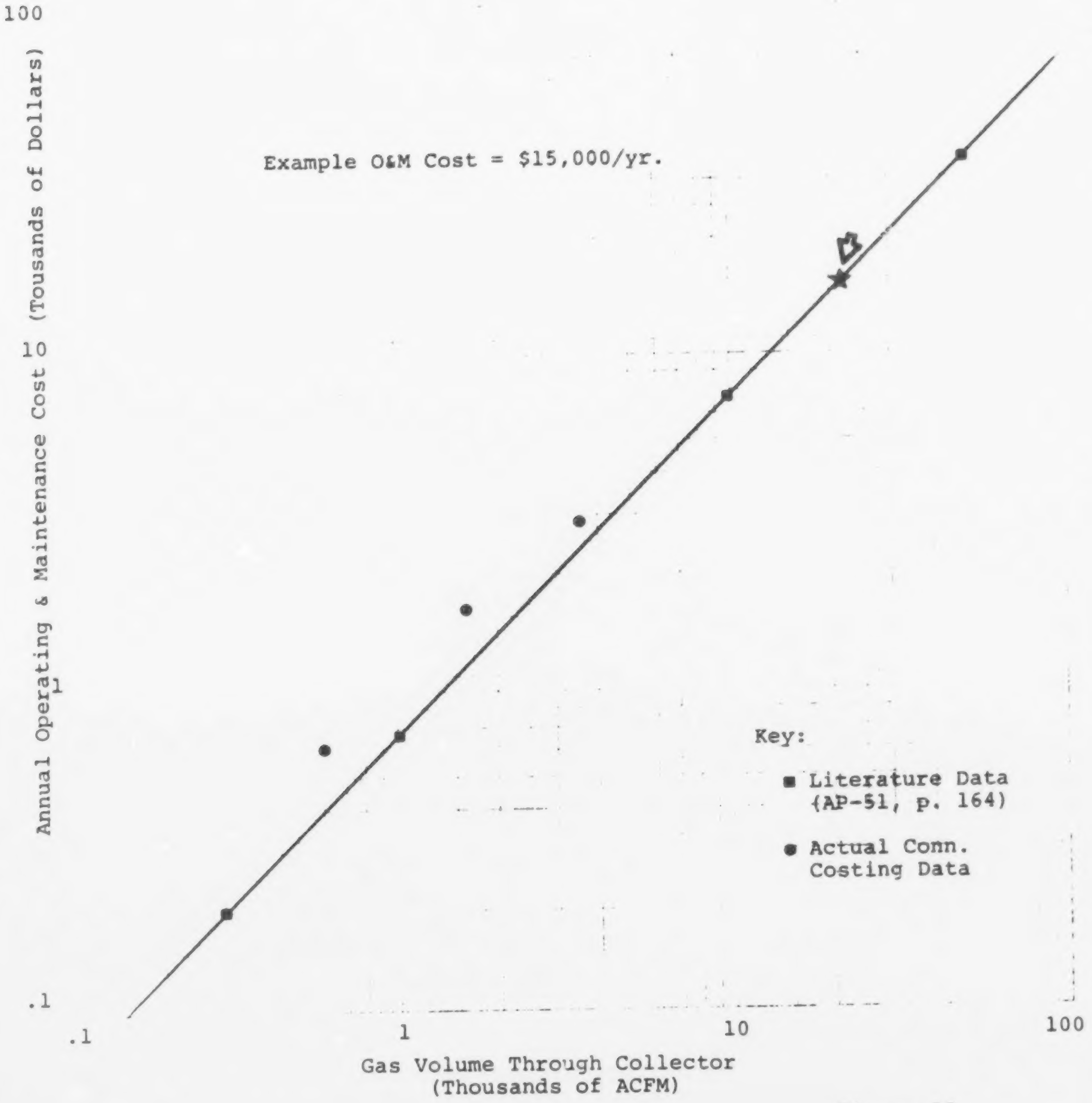


Figure 13

CHAPTER III

HANDLING INFLATION

Inflation affects both the purchase price of replacement equipment and the annual operating and maintenance costs. The significance of taking inflation into account in estimating the cash flow of the costs of compliance over a period of years hardly needs to be underlined after the experience of the last several years. Plant costs have increased almost 25 percent in 1972-74, and operating and maintenance costs, which reflect chiefly labor and energy costs, have been even more volatile.

INDEXING INFLATION

The economic assessment formula adjusts the estimated costs of compliance cash flow for inflation. All the Department need do is adjust the figure used as the assumed inflation (deflation) rate each year to reflect the average experience of the previous three years. A three-year rolling average is used to flatten out sudden sharp shifts in the rate both to reduce sudden shifts in assessment levels and because people making capital decisions similarly "smooth" adjustments in their "inflation expectations".

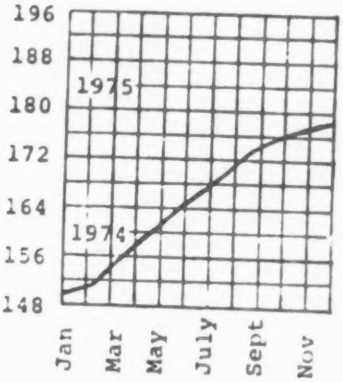
The civil assessment regulations allow the Commissioner to peg the inflation rate used in the assessment calculus to whatever index or indexes of price change he finds most appropriate. The U. S. Bureau of Labor Statistics, although it compiles cost indexes for hundreds of products and commodities, does not yet prepare a pollution control index.

The best available index is the CE Plant Cost Index published by the trade journal, Chemical Engineering. It contains four major components: (1) equipment machinery and supports, (2) construction labor, (3) building materials and labor, and (4) engineering supervision and manpower. This weighted index is generally accepted in the engineering profession as a highly accurate and reliable guide, and is currently used by the U. S. Environmental Protection Agency to update Agency publications.

Using this index, the rate of inflation (RI) the Department would use in its economic assessment calculus throughout 1975 would be 7.9 percent:

CALCULATING THE RATE OF INFLATION

CE Plant Cost Index (1957-59 = 100)



Annual Index	Inflation Rate	3 Year Average
1969 = 119.0		
1970 = 125.7		
1971 = 132.2		
1972 = 137.2	3.8%	
1973 = 144.1	5.0%	7.9%
1974 = 165.4	14.8%	

CHAPTER IV

ADJUSTING FOR INDIVIDUAL INCOME TAX RATES

The civil assessment formula (explained in Chapter I) assumes that the person subject to assessment is in a 48 percent income tax bracket. This is a workably accurate assumption for over 80 percent of all companies. However, there are a few companies that will have lower tax rates. Moreover, most individuals and partnerships will be taxed at a lower rate, and municipalities and nonprofit institutions are not subject to tax at all. For these cases the Department may wish to adjust the formula's tax assumption.

A source that does not pay income tax would be subject to a civil assessment roughly twice that of persons who are taxed at the 48 percent rate, assuming that the Department decides to adjust the formula for differences in tax rate. This is so because investing in and operating abatement facilities generates a series of tax deductions and credits. These tax benefits become more significant the higher the source's income tax is. The entire capital cost of the facility becomes a series of deductions through the tax laws' depreciation provisions, and these provisions allow especially accelerated depreciation on pollution control investments. The costs of operating and maintaining the facility are deductible in exactly the same manner as other business expenses. Further, pollution abatement investments are eligible for an investment tax credit. Without adjustment, the formula takes all these tax benefits into account automatically, at the 48 percent income tax rate.

Whether and how the Department wants to go about adjusting for differences in individual regulatees tax rates depends on whether it is dealing with corporations, individuals/partnerships, or municipalities.

Corporations

Generally the Department will not have to worry about adjusting for individual income tax rates where corporations are concerned. There are three types of corporations that may have low income tax rates: (1) companies operating at a loss, (2) companies that benefit from extraordinary tax deductions or credits, notably depletion allowances, even though they are operating profitably and (3) very small companies.

Companies operating at a loss generally do not expect to continue profitless for long. When they do become profitable, they will be able to use the tax advantages that accumulated during the period during which they were operating at a loss. Consequently, such companies will not alter their evaluation of of what an abatement project will cost them after tax significantly. Moreover, their calculations and the CEP formula take into account the after-tax costs of any commitment well into the future, and the normal businessman is most unlikely to assume that he will be operating unprofitably continuously for twenty years. In other words, the Department need not worry about adjusting the formula for companies operating temporarily at a loss.

Companies with low tax rates because of extensive deduction and credits other than for operating losses are, however, a more serious problem. Special provisions in the tax laws, most notably depletion allowances that benefit companies involved in extractive activities, can largely or entirely eliminate a company's income tax liability. U. S. Steel and Occidental Petroleum, for example, pay negligible income taxes because of the tax cover such provisions allow. For such companies the after tax cost of an abatement investment is much higher than for most other businesses. However, the situation is likely to be relatively rare, especially given recent Congressional action to reduce and eliminate the oil depletion allowances. Therefore, unless the Department is dealing with an extractive industry, the Department staff should probably not worry about such cases.

Very small companies will be taxed at significantly lower rates, because the tax on corporations is graduated. This year the rate is 20 percent for the first $25,000 of taxable income, 22 percent for the second $25,000 of taxable income, and 48 percent for taxable income in excess of $50,000. This schedule of rates is effective for 1975 only. If it is not extended or otherwise changed, the former schedule will apply. Those rates are 22 percent for the first $25,000, 26 percent for the second $25,000, and 48 percent thereafter. Where a corporation's taxable income is sufficiently low that its overall tax rate deviates substantially from 48 percent, the Department may well want to modify the formula's income tax rate assumptions to fit the specific facts of the case.

Individuals and Partnerships

When the Department is dealing with individuals or partnerships, it should initially assume a tax rate of 19 percent for individuals (the approximate Connecticut average for household heads in 1972) and 18 percent for partnerships (the approximate Connecticut average for manufacturing partners in 1969). In addition, given the wide range of effective tax rates paid by such persons, the Department will want to adjust its tax assessment formula from case to case. How it can do so at low cost is outlined in the section immediately after the brief discussion of municipalities.

Municipalities and Non-Profit Institutions

Municipalities and non-profit institutions do not pay income tax and therefore derive no tax benefits from whatever capital or operating and maintenance expenses they incur in order to abate pollution. When dealing with such institutions, the Department should adjust its civil assessment formula to assume a zero tax rate.

OBTAINING INDIVIDUAL TAX RATES

When the Department decides it must obtain individual tax rates in order to set accurate civil assessments, it can do so in two relatively simple ways:

- It can ask the regulatee to submit (1) its most recent balance sheets and income statements if it is a business and (2) its most recent income tax statement if the regulatee is an individual. This statement is private information, and can be obtained from the IRS only by a state tax agency. However, the civil assessment regulations specifically provide that the Department can require such information, including financial data, as it needs from the regulatee. Moreover, since individuals who are likely to be subject to civil assessments are also likely to be taxed at above average rates, the information will probably be provided voluntarily.
- For companies, especially publicly-held companies, this information is a matter of public record and may be found routinely in financial and investment publications such as Moody's Industrial Manual or the Value Line Investment Survey. (The first of these works is available in the Connecticut State Library.)

ADJUSTING THE FORMULA FOR CHANGES IN THE TAX LAWS

In applying civil assessments in individual cases, Department staff will not have to research or work through the impact of specific tax provisions. All this is handled automatically by the formula.

However, from time to time the provisions of the tax laws are changed. The investment tax credit is especially likely to be changed with cyclical change in the economy. The provisions in the formula should be changed accordingly. Chapter I identifies exactly where such adjustments should be made in the formula for each of the taxes that may have to be adjusted.

CHAPTER V

USING THE COST OF CAPITAL

One of the innovations of the Connecticut Enforcement Project is the attempt to put the regulatory agency into the shoes of the regulatee. Just as businessmen faced with environmental regulation focus immediately on the cost of raising and using money to meet environmental standards now and in the future, so must economic civil assessments take the current and continuing costs of using money into account.

Once the cost of compliance cash flow (which describes the cash outlays that will be required in each year of a control program) has been established, the economic assessment formula discounts it at the cost of capital rate appropriate to the particular regulatee to a present value. If the cost of capital is 10 percent, expenditures of a year from now of $1,100 would be discounted to a present value of $1000 (i.e., 1100/(1 + .10)).

Such discounting is necessary because ten dollars of expense three years from now is less painful than ten dollars due now. It is less painful because, over the three years one retains those ten dollars one can use them. If, for example, one could obtain a ten percent yield on one's resources in each of the three years, one would be justified in feeling that the net reduction in one's current worth attributable to this future ten dollar expense is $7.51([10/(1 + .10)^3]).

Businessmen evaluating the costs of different investment projects, including abatement projects, have to take the time value of money into account. They are keenly aware that $10 spent three years in the future entails considerably less cost than $10 spent now. Similarly, $10 received (or saved in taxes) three years hence is less valuable than such a saving received immediately. They consider the total present value of a project as its immediate costs plus future costs, reduced by a discount factor equal to the time value of money.

USING THE COST OF CAPITAL

The cost of capital to a regulatee is its marginal cost per year of obtaining additional capital funds.

For most businesses, the cost of capital is the weighted average of the costs of debt (e.g. bond issues or bank debt) and equity (e.g. sales of common stock). If a company's capital is 50 percent debt with a marginal cost of 10 percent, and 50 percent equity with a current cost of 20 percent, the company's cost of capital will be 15 percent.

The CEP formula uses a marginal cost of capital rate so that the low interest costs on bonds sold twenty or thirty years ago do not depress the rate so as to make it a misleading measure of the current cost of money to the regulatee. The marginal cost of capital rate also effectively reflects changes in the market price of money of all sorts. When interest rates go up (and common stock prices down), the marginal cost of capital will go up, accurately reflecting the increased cost a regulatee will have to pay for the resources required for the control project.

The cost of capital is the right discount factor to use in the economic assessment calculus because (1) it is the cost business must pay for its money and (2) it therefore represents a minimum rate of return businessmen must obtain on their investments. A business will be able to earn at least this rate of return on any resources available to it, which makes it the proper discount rate for bringing future costs to present value.

The cost of capital is also a good measure of the opportunity costs of investing in pollution control. Not only are the outlays required for such expenditures not recouped, but they clearly generate no income above expenses. In the meantime, the regulatee must pay its cost of capital rate to obtain the money needed to pay for the expenditures. The civil assessment formula discounts future costs by the cost of capital and includes opportunity costs by using the cost of capital as the interest rate in the amortization formula. The flat, monthly rate which is thereby derived represents not only the dollar cost of control but also an interest component which equals the minimum rate of return available on the investment. The resulting civil assessment thus offsets not only equipment and operating cost savings due to noncompliance but also the return on capital which would be made by investment of these savings in a profitable venture.

COMPONENTS OF THE COST OF CAPITAL

Since the cost of capital is the cost of raising or borrowing money, it is natural that different people and businesses have different costs of capital.

Industry-Wide Costs of Capital

Although the cost of capital is a key tool used all the time by businessmen and economists, it is hard to pin down exactly, especially on a company-by-company basis, chiefly because of the difficulty of measuring the cost of the equity component. If equity is based on book value, distortions are possible for a variety of accounting reasons, e.g. because assets purchased long ago that have appreciated substantially may still be carried at book value. Using market value avoids this difficulty; in fact, the market adjusts equity values taking future as well as current value into account. However, market values (1) are not available for many potential regulatees, and (2) are subject to sharp swings not always entirely caused by facts relevant to the particular case. Consequently, litigation to determine a company's cost of capital is almost always drawn out, expensive, and unhelpful.

Connecticut's CEP regulations avoid these difficulties entirely by using industry average cost of capital figures. This practice has several other, equally important advantages.

- The Department's staff will not have to gather financial data about each company and go through a series of financial calculations (with which most engineers are unfamiliar). Instead, the staff will only have to decide to which industry group the regulatee belongs and look up that industry's cost of capital on a one-page table maintained by the Department.
- The Department will not have to worry about adjusting for temporary changes in the strength of a company's financial condition.

Moreover, the use of industry average data seems an acceptably accurate surrogate measure of company cost of capital rates. The CEP calculated the cost of capital for a large number of Connecticut companies and found relatively small deviations from the industry average figures. The courts have long approved the use of industry average cost of capital figures in the regulation of individual companies.

The Department has now compiled industry-wide cost of capital averages for each of the industrial groupings in Connecticut. These averages were derived using the weighted cost of capital methodology outline above, using data drawn from such readily available and reliable sources as Standards and Poors, Financial Dynamics, the Federal Trade Commission's Quarterly Reports of Financial Data for Manufacturing Companies, and the Internal Revenue Service's Corporation Income Tax Returns. This table may be found in Section B in Chapter VII of Part V below.

Municipal Costs of Capital

Like businesses, municipalities have a cost of capital. Since bond revenue is usually the only source of raising capital for most cities, towns, and villages, the municipal cost of capital is usually equal to the bond rate which must be paid on newly issued municipal bonds. (While some economists believe that the governmental cost of capital should reflect the costs of taking money out of the private sector (and should thus be equal at least to the average private sector cost of debt), this theory has not yet achieved general acceptance -- at least not in the governmental community.) Accordingly, the municipal cost of capital will be the most recent average municipal bond rate in Connecticut.

Individual Costs of Capital

Individuals too have costs of capital, most frequently the interest rate they must pay on money they borrow. Accordingly, in instances where civil assessments are to be imposed against individuals, the individual cost of capital will be the current average interest rate on generally available personal loans.

PART IV

CIVIL ASSESSMENT REGULATIONS

VIOLATING EMISSIONS STANDARDS

ADMINISTRATIVE REGULATIONS

Regulations and notices published herein are printed exactly as submitted by the forwarding agencies. These, being official documents submitted by the responsible agencies, are consequently not subject to editing by the Commission on Official Legal Publications.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Assessment of Civil Penalties for Violation of Air Emissions Standards and Orders of the Commissioner

Section 1. The Regulations of Connecticut State Agencies are amended by adding sections 22a-6b-602 and 22a-6b-603, inclusive, as follows:

Sec. 22a-6b-602(a). Title

This section shall be known and may be cited as "Civil Penalty Regulations: Emission Violations."

Sec. 22a-6b-602(b). Definitions

(1) "Assessment period" means the period of time, expressed in months or portions thereof, during which a regulatee has failed to incur all the expenses necessary to insure immediate and continued compliance with applicable emission standards except that it does not include the time that a person is under a final order of the Commissioner, or the "order assessment period" defined in Section 22a-6b-603(b), or any period before the date on which Sections 22a-6b-602 and 22a-6b-603 of the Civil Penalty regulations become effective.

(2) "Civil penalties final order" means an order of the Commissioner issued pursuant to Sections 22a-6b-101, 22a-6b-602, and 22a-6b-603 of the Civil Penalty Regulations which has become final by the passage of time or by the consent of the regulatee or after hearing.

(3) "Commissioner" means the Commissioner of the Department of Environmental Protection or his lawfully designated agent.

(4) "Compliance timetable" means the schedule of dates by which a person under a final order is to come into compliance with Department regulations.

(5) "Cost of capital" means either: (i) the weighted average of the marginal rates the Commissioner finds a person or class of persons typically must pay per year for debt and owner's equity or (ii) the annual rate of return or of savings that the Commissioner finds a person or class of persons could achieve with a sum of money equal to the cost of compliance; as determined by the Commissioner for a person or class of persons.

(6) "Cost of compliance" means the net, after tax, estimated present value of the sum of equipment costs, operating costs, and all other costs and savings the regulatee will experience in order to come into compliance including, but not limited to inflation, depreciation, such replacement costs as will later be necessary to replace capital equipment that has either worn out or become obsolete, and a discount rate equal to the cost of capital.

(7) "Department" means the Department of Environmental Protection.

(8) "Depreciable life" means the time period of useful life expectancy for capital plant and equipment. This period shall be defined as 10 years until and unless the Commissioner finds otherwise pursuant to Section 22a-6b-602(g)(2) in which case he may consider the depreciation periods allowed for tax purposes by the U. S. Internal Revenue Service and such other guides as he determines are similarly reliable.

(9) "Depreciation" means the amortization of equipment costs over their depreciable life.

(10) "Emit" means the act of releasing or discharging or causing to be released or discharged any air pollutant in violation of the terms of Sections 19-508-9 and 19-508-18 to 19-508-22, inclusive, of the Regulations for the Abatement of Air Pollution. An "emissions standard" is any requirement set forth in Sections 19-508-9 and 19-508-18 to 19-508-22, inclusive, and an "emissions violation" is a violation of an emissions standard.

(11) "Equipment costs" means the installed capital costs of such equipment as is or may be required to bring an unabated activity into compliance with applicable emission standards. Such costs shall include, but not be limited to, the cost of equipment required to control emissions effectively, auxilliary equipment, technical and engineering services, and all development and start-up costs including labor, materials and necessary testing. For the purpose of estimating the cost of compliance prior to the date that the unabated activity has been brought into compliance with applicable emissions standards, the Commissioner may assume that what he finds to be the most environmentally effective and reliable equipment available will be used. The Commissioner shall, upon petition by the regulatee once the regulatee has come into compliance, correct the penalty due using actual equipment costs pursuant to Section 22a-6b-602(g)(2).

(12) "Final order" means an order of the Commissioner issued pursuant to Title 19, Chapter 360, Sections 19-508, 19-510, 19-514, 19-515 and/or 19-517 of the Connecticut General Statutes which has become final by the passage of time or by the consent of the regulatee or after hearing.

(13) "Inflation" means the average annual rate of inflation as measured by the changes in the Wholesale Price Index prepared by the United States Department of Labor or such other index of inflation as the Commissioner may determine is most appropriate over the 3 years prior to the year in which the civil penalty is to be assessed.

(14) "Operating costs" means the non-depreciable annual costs for the operation and maintenance of equipment and processes required for the abatement of air pollution which will protect installed control equipment and insure continuous compliance with applicable emission standards.

(15) "Person" includes every individual, firm, partnership, association, syndicate, company, trust, corporation, municipality, and any other legal entity.

(16) "Regulatee" means a person who owns or operates a process or piece of property that has been, is, or may become an unabated activity.

(17) "Unabated activity" means the ownership or operation of any process or piece of property, real or personal, which (i) emits or causes to be emitted, any air pollutant in excess of the emission standards prescribed in Section 19-508-9 and 19-508-18 to 19-508-22, inclusive, of the Regulations for the Abatement of Air Pollution or (ii) is not equipped or operated with the emission controls required by Sections 19-508-18 to 19-508-22 Ownership or operation of each such process or piece of property is a separate "unabated activity" regardless of the number of identical or closely similar processes or pieces of property owned by the same person or located on the same premises.

Sec. 22a-6b-602(c). Civil penalties for violating emission standards

Any person carrying on an unabated activity shall be liable for a civil penalty assessed by the Commissioner pursuant to Public Act 73-665, Section 2(a)(2), and in accordance with the procedures prescribed in Section 22a-6b-100 to 22a-6b-102, inclusive, of the Civil Penalty Regulations.

Sec. 22a-6b-602(d). Schedule of maximum assessments

(1) Persons maintaining unabated activities may be assessed monthly amounts for each such activity no greater than the amount listed in the following schedule for the combination of equipment costs and operating costs which will be or has been required to bring the unabated activity into compliance with applicable emissions standards.

(2) The maximum monthly amounts set forth in this schedule represent the economic advantages a person responsible for an unabated activity could gain from one month's delay in bringing that activity into compliance assuming economic and tax conditions all tending to increase the value to the regulatee of such delay. These maximum amounts have been calculated in three broad steps: a gross cash flow for each set of compliance expenditures, chiefly equipment costs and operating costs, is defined; this gross cash flow is discounted to present value; and the maximum monthly civil penalty is calculated as that amount which would, if paid monthly, amortize the gross present value of the project. The Commissioner shall provide a written explanation of these calculations upon request.

(3) The Commissioner shall impose lesser penalties pursuant to Section 22a-6b-602(e)(1-2) if he finds the probable advantages of delay are smaller than indicated in this schedule, and he may further lower these penalties pursuant to Sections 22a-6b-602(e)(5) and/or 22a-6b-602(g).

(4) In no case shall the assessment exceed $25,000 plus $1000 for each day that the unabated activity continues after the regulatee has received a civil penalties final order.

(5) The Commissioner has determined that the remedies provided by this schedule will insure immediate and continued compliance and will protect (i) the public health, safety, and welfare; (ii) the public trust in the air, water, land and other natural resources of the state; and (iii) the reasonable use of property.

Sec. 22a-6b-602(e). Determination of amount in individual cases

(1) The Commissioner shall determine the amount of the monthly civil penalty he may assess for any individual unabated activity based on the actual or probable cost of compliance required of that particular activity. Individual assessments are calculated in four broad steps: the gross cash flow of the required compliance expenditures, chiefly equipment costs and operating costs, is determined; the net cash flow is established by taking tax and other savings into account; this net cash flow is discounted to present value; and the individual monthly civil penalty is calculated as that amount which would, if paid monthly, amortize the net present value of the project.

(2) The Commissioner shall calculate the total civil penalty by multiplying the monthly civil penalty by the number of months or fractions thereof in the assessment period.

(3) The Commissioner shall provide a written explanation of this methodology upon request. He shall also provide a written summary of the calculations used to determine a particular assessment, except to the extent he is required to maintain the confidentiality of certain information pursuant to Section 22a-6b-602(i), upon written request by an interested party or the affected regulatee.

(4) In no case shall an individual assessment exceed either (i) the maximum civil penalty Section 22a-6b-602(d) would allow per month for an unabated activity with the same equipment costs and operating costs or (ii) for the total civil penalty due during the entire assessment period, $25,000 plus $1000 for each day that the unabated activity continues after the regulatee has received a civil penalties final order.

Schedule of Maximum Allowable Monthly Civil Penalties for an Unabated Activity with Specified Costs.

Operating Costs	Equipment Costs													
	$0-2500	$2501-5000	$5001-10,000	$10,001-20,000	$20,001-35,000	$25,001-50,000	$50,001-70,000	$70,001-100,000	$100,001-150,000	$150,001-200,000	$200,001-300,000	$300,001-500,000	$500,001-1,000,000	$1,000,000 and above
$0-1000	188.	263.	415.	717.	1170.	1623.	2227.	3134.	4645.	6155.	9177.	15220.	30328.	•
$1001-2500	357.	432.	583.	885.	1339.	1792.	2396.	3303.	4813.	6324.	9346.	15389.	30496.	•
$2501-5000	638.	713.	864.	1166.	1620.	2073.	2677.	3584.	5094.	6605.	9627.	15670.	30777.	•
$5001-7500	919.	994.	1145.	1448.	1901.	2354.	2958.	3865.	5375.	6886.	9908.	15951.	31058.	•
$7501-10,000	1200.	1275.	1426.	1729.	2182.	2635.	3239.	4146.	5657.	7167.	10189.	16232.	31340.	•
$10,001-15,000	1762.	1837.	1989.	2299.	2744.	3197.	3801.	4708.	6219.	7729.	10751.	16794.	31902.	•
$15,001-20,000	2324.	2400.	2551.	2853.	3306.	3759.	4364.	5270.	6781.	8292.	11313.	17356.	32464.	•
$20,001-25,000	2886.	2962.	3113.	3415.	3868.	4321.	4926.	5832.	7343.	8854.	11875.	17918.	33026.	•
$25,001-35,000	4011.	4086.	4237.	4539.	4993.	5446.	6050.	6957.	8467.	9978.	13000.	19043.	34150.	•
$35,001-50,000	5697.	5772.	5924.	6226.	6679.	7132.	7736.	8643.	10154.	11664.	14686.	20729.	35837.	•
$50,001-75,000	8508.	8583.	8734.	9036.	9490.	9943.	10547.	11454.	12964.	14475.	17497.	23540.	38647.	•
$75,001-100,000	11318.	11394.	11545.	11847.	12300.	12754.	13358.	14264.	15775.	17286.	20307.	26350.	41458.	•
$100,001-200,000	22561.	22637.	22788.	23090.	23543.	23996.	24601.	25507.	27618.	28528.	31550.	37593.	52701.	•
$200,001-350,000	39425.	39501.	39652.	39954.	40407.	40861.	41463.	42371.	43882.	45393.	48415.	54458.	•	•
$350,001 and above	•	•	•	•	•	•	•	•	•	•	•	•	•	•

• No more than $25,000 plus $1000 for each day that the unabated activity continues after the regulatee has received a civil penalties final order.

(5) In setting a civil penalty in a particular case, the Commissioner shall consider all factors which he deems relevant, including, but not limited to those listed below; and he may, as a result of considering and balancing these factors, lower the civil penalty. The factors he shall consider include:

(i) The amount of the assessment necessary to insure immediate and continued compliance;

(ii) The character and degree of impact the unabated activity has on the public trust in the air, water, and land and on the natural resources of the state, especially any rare or unique natural phenomena;

(iii) The character and degree of injury to, or interference with, public health, safety or welfare which is caused or threatened to be caused by the unabated activity;

(iv) The conduct of the person incurring the civil penalty in taking all feasible steps or procedures necessary or appropriate to comply or to correct the unabated activity;

(v) Any prior violations by such person of statutes, regulations, orders or permits administered, adopted or issued by the Commissioner;

(vi) The economic and financial conditions of such person;

(vii) The character and degree of injury to, or interference with reasonable use of property which is caused or threatened to be caused by such unabated activity.

Sec. 22a-6b-602(f). Enforcement proceedings

(1) **Warning letter**. If the Commissioner finds that an emissions violation has probably occurred, he shall send the responsible regulatee a civil penalties warning letter by certified mail or by personal delivery or service. This letter shall notify the regulatee that the Commissioner has reason to believe a violation has occurred. For those cases to which Sections 22a-6b-602(g)(4)(i) and 22a-6b-602(g)(4)(ii) apply, this warning letter shall also notify the regulatee that it may be able to avoid the imposition of civil penalties under Section 22a-6b-602 if it takes prompt and effective action pursuant to the terms of Section 22a-6b-602(g)(4).

(2) **Hearings**. (i) Any person in receipt of a notice of violation issued pursuant to Section 22a-6b-101(a) of the Civil Penalty Regulations may apply to the Commissioner for a hearing pursuant to Section 22a-6b-101(b).

(ii) Such hearing shall be conducted by the Commissioner, a Deputy Commissioner, or a hearing officer from the Office of Adjudication of the Department. Such hearing shall be conducted pursuant to Sections 4-177 to 4-185, inclusive, of the General Statutes and to the Rules of Practice of the Department.

(iii) The Department shall have the burden of producing evidence to prove the emissions violation that provides the basis for imposing the penalty and the reasonableness of the proposed assessment, and the risk of non persuasion by a preponderance of the evidence shall fall upon the Department.

(iv) If the Commissioner, Deputy Commissioner, or hearing officer presiding at the hearing determines that information important to an accurate determination of all or part of the civil penalty amount is not available at the time of the hearing but will become available later, he may defer determining the amount of the civil penalty due until he establishes that the previously missing information is available, at which time he shall promptly hold a hearing pursuant to Section 22a-6b-602 (g)(2) regarding the amount of the civil penalty due. He may not collect any portion of the civil penalty until this hearing is held and a civil penalties final order issued.

(3) **Appeals**. Any person may appeal a civil penalty final order of the Commissioner issued after a hearing pursuant to Section 2(f) of Public Act 73-665.

Sec. 22a-6b-602(g). Mitigation

(1) **General**. The Commissioner may mitigate any civil penalty upon such terms as he in his discretion deems proper or necessary upon consideration of the factors set forth in Sections 2(b) and 2(c) of Public Act 73-665.

(2) **Correction of penalties**. (i) A regulatee in receipt of a notice of violation issued pursuant to Section 22a-6b-101(a) of the Civil Penalty Regulations may petition the Commissioner for correction of the civil penalty assessed against him at any time up to two years after the Commissioner finds that the regulatee has come into compliance. Such petition shall set forth in writing any evidence that the cost of compliance has been or will be less than the Commissioner had initially determined in assessing the civil penalty, and it shall be sent by certified mail or personal service to the Commissioner or the Director of Air Compliance.

(ii) The Commissioner may, in response to such a petition or at his own initiative, lower an assessment he determines was excessive. If the Commissioner takes no action in response to such a petition, or if his response is not satisfactory to the regulatee, the regulatee may obtain a hearing of right once it has come into compliance or at any other time specified in a final order or a civil penalties final order. Following such a hearing the Commissioner shall mitigate the civil penalty if and to the extent that the actual cost of compliance has been less than he had initially determined.

(iii) Refunds shall be made with interest calculated from the time of payment and at the cost of capital rate used to assess the civil penalty.

(3) **Reduction of the assessment period for delays beyond the regulatee's control**. The Commissioner shall exclude from the assessment period such periods of noncompliance as the regulatee proves have been caused by strikes or lockouts; riots, wars, or other acts of violence; floods, hurricanes, or other Acts of God; or other equally severe, unforeseeable and uncorrectible accidents, where such acts or events were occasioned directly upon the regulatee or a person under contract to the regulatee. In addition, the Commissioner shall exclude from the assessment period such periods of non-compliance as were occasioned by delays attributable to the Air Compliance Unit of the Department in excess of routine processing times. Nothing in this section shall prohibit a regulatee from proposing, or the Department from accepting, a compliance timetable which excludes from the assessment period periods of non-compliance caused by other acts or events beyond the control of the regulatee, such as contractors' or suppliers' delays.

(4) **Nonimposition during prompt compliance**. (i) If, upon receipt of a warning letter defined in Section 22a-6b-602(f)(1) and continuously thereafter until (a) the end of ninety days or such longer period as the Commissioner may allow or (b) at the end of the assessment period, whichever occurs first, the regulatee takes all steps necessary to bring the unabated activity promptly and effectively into continuing compliance with applicable emissions standards, the Commissioner shall not impose the civil penalty assessable under section 22a-6b-602 before (a) the end of the ninety day period or such longer period as the Commissioner may allow or (b) the end of the assessment period, whichever occurs first.

(ii) If the warning letter requests preparation of a compliance plan, the regulatee shall be deemed to have taken prompt and effective action during the period between receipt of such a request and submission of the requested plan if (a) the plan is a detailed written plan of action including a timetable which, once implemented, will achieve compliance as promptly and effectively as possible and if (b) it is submitted no later than forty days after receipt of such a request. The regulatee shall also be deemed to have taken prompt and effective action, even though it takes no further steps, during the subsequent period between its submission of such a satisfactory plan of action and five days after it has been notified that the Department has completed its review of the plan and/or has issued a compliance order. Thereafter — and, if the warning letter does not request the preparation of a compliance plan, from the time the regulatee receives the warning letter — the regulatee must take all steps necessary to achieve continuing compliance as promptly and effectively as possible if it is to meet the standard of performance required in Section 22a-6b-602(g)(4)(i).

(iii) Sections 22a-6b-602(g)(4)(i) and 22a-6b-602(g)(4)(ii) shall not apply to persons to whom the Department has, within the preceding 5 years, issued a written order under Section 19-508-12(b)(2) of the Regulations for the Abatement of Air Pollution; or a warning letter under Section 22a-6b-602(f)(1) of this regulation; or actual written notice that that person has been found in violation of one or more emissions standards; or actual written notice both of the duty to comply with the relevant requirements of Sections 19-508-9 and 19-508-18 to 19-508-22, inclusive, and of the potential liability to civil penalties for failure to do so; provided that such prior order, warning letter, or actual notice (1) refers to the same section(s) of the Department's Regulations for the Abatement of Air Pollution that are the subject of the current action and (2) was given by certified mail or by personal delivery or service.

(5) **Notice.** (i) The Commissioner shall report every case in which he lowers a civil penalty pursuant to Section 22a-6b-602(e) or in which he mitigates a civil penalty pursuant to Sections 22a-6b-602(g)(1-3), if the monthly civil penalty without such lowering or mitigation would be greater than three hundred dollars, in the Monthly Report of Activities of the Air Compliance Unit. This report shall state the name and address of the regulatee, the amount of the reduction, the amount of the civil penalty still to be assessed, and the grounds for such lowering or mitigation.

(ii) The Commissioner shall also send written notice to all persons who have, within the preceeding twelve months, requested copies of this Monthly Report, either through the Monthly Report or otherwise, of any hearings to be held regarding such cases where the amount of the civil penalty may be an issue at least ten days prior to the hearing.

Sec. 22a-6b-602(h). Limited inclusion of past failure to abate in the assessment period

If the Commissioner finds that it is reasonable to infer that the emissions violation(s) for which a civil penalty is being assessed are the result of a regulatee's past failure to make the control expenditures necessary to bring the similar activities into compliance with applicable emissions standards, and if the regulatee is not protected from the imposition of civil penalties pursuant to Section 22a-6b-602(g)(4), the Commissioner may include the period of such pre-violation failure in the assessment period used to calculate the civil penalty as prescribed in Section 22a-6b-602(e) subject to the following limitations:

(1) No assessment period shall begin before the date on which this regulation becomes effective;

(2) No assessment period shall include a pre-detection period greater than two years.

Sec. 22a-6b-602(i). Request for information by the commissioner

(1) The Commissioner may require the regulatee to provide such additional information, including information regarding costs, as he deems necessary to effectuate the purposes of Section 22a-6b-602.

(2) Any person who files any statement, record or report with the Commissioner containing false or misleading information or other claims will be liable to criminal prosecution for a Class A misdemeanor punishable by imprisonment for a period of up to one year and a fine of up to one thousand dollars ($1000) for each violation pursuant to Section 53a-157 of the Connecticut General Statutes.

(3) Any information disclosing trade secrets and commercial or financial information provided by a regulatee pursuant to this section will remain confidential if the regulatee so requests in a letter sent by certified mail or personal service to the Commissioner or the Director of Air Compliance, except that such information may be disclosed to other officers, employees, or authorized representatives of the state concerned with carrying out these regulations or when relevant in any hearing conducted under the authority of these regulations by the Department of Environmental Protection or in any judicial proceeding, subject to such safeguards as the hearing officer or presiding judge may impose.

Sec. 22a-6b-602(j). Collection

(1) Payment of the civil penalties assessed under this section may be required monthly, or at such time or time intervals as the Commissioner determines will most effectively limit the Department's administrative costs and further the objectives defined in Section 22a-6b-602(d).

(2) The present value of the total civil penalty assessed, calculated at the time the notice of violation is issued, shall be held constant regardless of the timing of its collection.

VIOLATING THE TERMS OF AN ORDER

ADMINISTRATIVE REGULATIONS

Regulations and notices published herein are printed exactly as submitted by the forwarding agencies. These, being official documents submitted by the responsible agencies, are consequently not subject to editing by the Commission on Official Legal Publications.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Sec. 22a-6b-603(a). Title

This section shall be known and may be cited as "Civil Penalty Regulations: Violation of the Terms of an Order to Abate an Emissions Violation."

Sec. 22a-6b-603(b). Definitions

Except for the following terms, the definitions of Section 22a-6b-602(b) will apply to these regulations:

(1) "Order assessment period" means the period of time, expressed in months or portions thereof, that a person under a final order is behind in conforming to that order's compliance timetable as measured by the time that has elapsed between the date of a scheduled deadline and the date that the abatement, control or compliance measures called for in the scheduled deadline are actually completed.

(2) "Scheduled deadline" means the date in a compliance timetable by which an abatement, control, or compliance measure is scheduled to be completed; such deadline may be for any of the intermediate steps in the compliance timetable or for the final step at which compliance is to be completed.

Sec. 22a-6b-603(c). Civil penalties for violating the terms of an order

Any person subject to a final order of the Commissioner to abate an emissions violation who is not in compliance with the terms of that order shall be liable to a civil penalty assessed by the Commissioner pursuant to Public Act 73-665, Section 2(a)(3), in accordance with the procedures prescribed in Section 22a-6b-101 to 22a-6b-102 of the Civil Penalty Regulations, inclusive.

Sec. 22a-6b-603(d). Schedule of maximum assessments

(1) Persons responsible for an unabated activity that is under but not in compliance with the terms of a final order may be assessed a civil penalty no larger than the product of (a) the maximum monthly civil penalty the Commissioner may assess under the schedule of maximum assessments of Section 22a-6b-602(d) against a person

for an unabated activity with the same equipment costs and operating costs and (b) the number of months and/or fractions thereof the Commissioner determines are in the order assessment period.

(2) The Commissioner shall provide a written explanation of how these maximum assessments are calculated to any regulatee upon request.

(3) The Commissioner shall impose lesser penalties pursuant to Section 22a-6b-603(c)(1-2) if he finds the probable advantages of delay are smaller than indicated in this schedule, and he may further lower these penalties pursuant to Sections 22a-6b-603(e)(5) and/or 22a-6b-603(g).

(4) In no case shall the assessment exceed $25,000 plus $1000 for each day that the unabated activity continues after the regulatee has received a civil penalties final order.

(5) The Commissioner has determined that the maximum remedies provided in this schedule will insure immediate and continued compliance and will protect (i) the public health, safety, and welfare; (ii) the public trust in the air, water, land and other natural resources of the state; and (iii) the reasonable use of property.

Sec. 22a-6b-603(e). Determination of amount in individual cases

(1) The Commissioner shall determine the amount of the monthly civil penalty he may assess for each individual case of an unabated activity not conforming to or complying with the terms of a final order based on the actual or probable cost of compliance required of that particular activity. Individual assessments are calculated in four broad steps: the gross cash flow of the required compliance expenditures, chiefly equipment costs and operating costs, is determined; the net cash flow is established by taking tax and other savings into account; this net cash flow is discounted to present value; and the individual monthly civil penalty is calculated as that amount which would, if paid monthly, amortize the net present value of the project.

(2) The Commissioner shall calculate the total civil penalty by multiplying the monthly civil penalty by the number of months or fractions thereof in the order assessment period.

(3) The Commissioner shall provide a written explanation of this methodology upon request. He shall also provide a written summary of the calculations used to determine a particular assessment, except to the extent he is required to maintain the confidentiality of certain information pursuant to Section 22a-6b-603(h), upon written request by an interested party or the affected regulatee.

(4) In no case shall an individual assessment exceed either (i) the maximum civil penalty Section 22a-6b-602(d) would allow per month for an unabated activity with the same equipment costs and operating costs, or (ii) for the total civil penalty due during the entire order assessment period, $25,000 plus $1000 for each day that the unabated activity continues after the regulatee has received a civil penalties final order.

(5) In setting a civil penalty in a particular case, the Commissioner shall consider all factors which he deems relevant, including but not limited to those listed below; and he may, as a result of considering and balancing these factors, lower the civil penalty. The factors he shall consider include:

(i) The amount of the assessment necessary to insure immediate and continued compliance;

(ii) The character and degree of impact the unabated activity has on the public trust in the air, water, and land and on the natural resources of the state, especially any rare or unique natural phenomena;

(iii) The character and degree of injury to, or interference with, public health, safety or welfare which is caused or threatened to be caused by the unabated activity;

(iv) The conduct of the person incurring the civil penalty in taking all feasible steps or procedures necessary or appropriate to comply or to correct the unabated activity;

(v) Any prior violations by such person of statutes, regulations, orders or permits administered, adopted or issued by the Commissioner;

(vi) The economic and financial conditions of such person;

(vii) The character and degree of injury to, or interference with reasonable use of property which is caused or threatened to be caused by such unabated activity.

Sec. 22a-6b-603(f). Enforcement proceedings

(1) **Hearings.** (i) Any person in receipt of a notice of violation issued pursuant to Section 22a-6b-101(a) of the Civil Penalty Regulations may apply to the Commissioner for a hearing pursuant to Section 22a-6b-101(b).

(ii) Such hearing shall be conducted by the Commissioner, a Deputy Commissioner, or a hearing officer from the Office of Adjudication of the Department. Such hearing shall be conducted pursuant to Sections 4-177 to 4-185 of the General Statutes and to the Rules of Practice of the Department.

(iii) The Department shall have the burden of producing evidence to prove the basis for imposing the penalty and the reasonableness of the proposed assessment, and the risk of non-persuasion by a preponderance of the evidence shall fall upon the Department.

(iv) If the Commissioner, Deputy Commissioner, or hearing officer presiding at the hearing determines that information important to an accurate determination of all or part of the civil penalty amount is not available at the time of the hearing but will become available later, he may defer determining the amount of the civil penalty due until he establishes that the previously missing information is available, at which time he shall promptly hold a hearing pursuant to Section 22a-6b-603(g)(2) regarding the amount of the civil penalty due. He may not collect any portion of the civil penalty until this hearing is held and a civil penalties final order issued.

(2) **Appeals.** Any person may appeal a civil penalties final order of the Commissioner issued after a hearing pursuant to Section 2(f) of Public Act 73-665.

Sec. 22a-6b-603(g). Mitigation

(1) **General.** The Commissioner may mitigate any civil penalty upon such terms as he in his discretion deems proper or necessary upon consideration of the factors set forth in Sections 2(b) and 2(e) of Public Act 73-665.

(2) **Correction of penalties.** (i) A regulatee in receipt of a notice of violation issued pursuant to Section 22a-6b-101(a) of the Civil Penalty Regulations may petition the Commissioner for correction of the civil penalty assessed against him at any time up to two years after the Commissioner finds that the regulatee has come into compliance. Such petition shall set forth in writing any evidence that the cost of compliance has been or will be less than the Commissioner had initially determined in assessing the civil penalty, and it shall be sent by certified mail or personal service to the Commissioner or the Director of Air Compliance.

(ii) The Commissioner may, in response to such a petition or at his own initiative, lower an assessment he determines was excessive. If the Commissioner takes no action in response to such a petition, or if his response is not satisfactory to the regulatee, the regulatee may obtain a hearing of right once it has come into compliance or at any other time specified in a final order or a civil penalties final order. Following such a hearing the Commissioner shall mitigate the civil penalty if and to the extent that the actual cost of compliance has been less than he had initially determined.

(iii) The Commissioner shall also mitigate the civil penalty if and to the extent that the regulatee comes into actual final compliance with less delay than the total number of days of delay for which assessments have previously been made while the regulatee was under a final order.

(iv) Refunds shall be made with interest calculated from the time of payment and at the cost of capital rate used to assess the civil penalty.

(3) **Reduction of the order assessment period for delays beyond the regulatee's control.** The Commissioner shall exclude from the order assessment period such periods of non-compliance as the regulatee proves (i) have been caused by strikes or lockouts; riots, wars, or other acts of violence; floods, hurricanes, or other Acts of God; or other equally severe, unforeseeable and uncorrectible accidents; where such acts or events were occasioned directly upon the regulatee or a person under contract to the regulatee. In addition, the Commissioner shall exclude from the order assessment period such periods of non-compliance as were occasioned by delays attributable to the Air Compliance Unit of the Department in excess of routine processing times. Nothing in this section shall prohibit a regulatee from proposing, or the Department from accepting, a compliance timetable which excludes from the order assessment period periods of non-compliance caused by other acts or events beyond the control of the regulatee, such as contractors' or suppliers' delays.

(4) **Notice.** (i) The Commissioner shall report every case in which he lowers a civil penalty pursuant to Section 22a-6b-603(e) or in which he mitigates a civil penalty pursuant to Section 22a-6b-603(g)(1-3), if the monthly civil penalty without such lowering or mitigation would be greater than three hundred dollars, in the Monthly Report of Activities of the Air Compliance Unit. This report shall state the name and address of the regulatee, the amount of the reduction, the amount of the civil penalty still to be assessed, and the grounds for such lowering or mitigation.

(ii) The Commissioner shall also send written notice to all persons who have, within the preceding twelve months requested copies of this Monthly Report, either through the Monthly Report or otherwise, of any hearings to be held regarding such cases where the amount of the civil penalty may be an issue at least ten days prior to the hearing.

Sec. 22a-6b-603(h). Request for information by the commissioner

(1) The Commissioner may require the regulatee to provide such additional information, including information regarding costs, as he deems necessary to effectuate the purposes of Section 22a-6b-603.

(2) Any person who files any statement, record or report with the Commissioner containing false or misleading information or other claims will be liable to criminal prosecution for a Class A misdemeanor punishable by imprisonment for a period up to one year and a fine of up to one thousand dollars ($1000) for each violation pursuant to Section 53a-157 of the General Statutes.

(3) Any information disclosing trade secrets and commercial or financial information provided by a regulatee pursuant to this section will remain confidential if the regulatee so requests in a letter sent by certified mail or personal service to the Commissioner or the Director of Air Compliance, except that such information may be disclosed to other officers, employees, or authorized representatives of the state concerned with carrying out these regulations or when relevant in any hearing conducted under the authority of these regulations by the Department of Environmental Protection or in any judicial proceeding, subject to such safeguards as the hearing officer or presiding judge may impose.

Sec. 22a-6b-603(i). Collection

(1) Payment of the civil penalties assessed under this section may be required monthly, or at such time or time intervals as the Commissioner determines will most effectively limit the Department's administrative costs and further the objectives defined in Section 22a-6b-603(d).

(2) The present value of the total civil penalty assessed, calculated at the time the notice of violation is issued, shall be held constant regardless of the timing of its collection.

Be it known that the foregoing regulations are made, adopted and promulgated by the undersigned pursuant to Sections 22a-6 and 19-508 of the General Statutes and Section 2 of Public Act No. 665 of the 1973 Public Acts, after the publication in the Connecticut Law Journal on September 24, 1974, of the notice of the proposal to adopt them, the holding of advertised public hearings on November 12, 13, and 14, 1974, and after consideration of all relevant matter presented, pertaining to Assessment of Civil Penalties for Violation of Air Emissions Standards and Orders of the Commissioner.

In Witness Whereof, I have hereunto set my hand and seal this 27th day of November, 1974.

DOUGLAS M. COSTLE
Commissioner

Approved: Attorney General, December 20, 1974; Standing Legislative Regulations Review Committee, December 16, 1974. Received and filed: Secretary of the State, January 2, 1975. Effective January 2, 1975.

VIOLATING PROGRESS REPORT REQUIREMENTS

ADMINISTRATIVE REGULATIONS

Regulations and notices published herein are printed exactly as submitted by the forwarding agencies. These, being official documents submitted by the responsible agencies, are consequently not subject to editing by the Commission on Official Legal Publications.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Submission of Progress Reports and Assessment of Civil Penalties

Section 1. Section 19-508-12 of the Regulations of Connecticut State Agencies is amended by adding a new subsection (f) as follows:

Sec. 19-508-12. Violations and enforcement

(f) **Progress report requirements.** (1) Requirement, time, form. Any person against whom a final order has been issued shall submit progress reports as required and prescribed by the terms of the order. Such progress reports shall be submitted in such a form as the commissioner prescribes.

(f) (2) Contents. Progress reports shall contain a separate declaration for each required step of an order's compliance timetable, stating either that compliance with the step is on schedule, or that compliance with the step is off-schedule. Progress reports declaring that compliance is proceeding on-schedule shall contain a concise but comprehensive description of (1) the action completed on each and every step required by the order during the time period covered by the report, and (2) the date or dates on which compliance with such step or steps was completed. Progress reports declaring that compliance is proceeding off-schedule shall contain a concise but comprehensive description of (1) the specific reasons for the tardiness, (2) the current state of completion, and (3) the special action which will be taken to return "on schedule" by the date of the next progress report. Progress reports shall contain such other information as the commissioner may require by the terms of a final order.

(f) (3) Proof of compliance. Progress reports shall include the name and address of any vendor whose goods were ordered for compliance purposes since the prior progress report. Where the terms of an order reported upon require the purchase of any material, service or equipment, progress reports shall include copies of the purchase order or orders. The commissioner may require such other proof as he deems necessary to determine the progress and degree of compliance.

(f) (4) Verification of contracted work. Progress reports shall include the name and address of any consultants, subcontractors, or other agents employed under the terms of the order since the prior progress report together with a concise but comprehensive description of the actions they are to take to assist in compliance with the orders. Whenever any vendor, consultant, subcontractor or other agent is undertaking any activity regarding any step in the order, the progress report shall include a verification by the person under order that the vendor, consultant, subcontractor, or other agent is proceeding on-schedule.

(f) (5) Liability. Any person required to submit progress reports shall be liable for failure to meet any of the requirements of this section notwithstanding any delegation of responsibility to an agent to complete and submit reports. Any person who files a progress report containing false or misleading information or other claims shall be subject to criminal prosecution pursuant to section 53a-157 of the General Statutes.

Civil Penalty Regulations for Air Compliance

Sec. 22a-6b-600. Title

Sections 22a-6b-600 to 22a-6b-900 inclusive, shall be known and may be cited as "Civil Penalty Regulations: Air Compliance."

Sec. 22a-6b-601. Violation of progress report requirements

When, following hearing or default, the commissioner determines that a person has failed to submit a progress report in compliance with the requirements of section 10-508-12 (f), and that mitigating circumstances do not justify waiver or reduction of penalties, the commissioner may issue or make final an order, assessing a civil penalty according to the following schedule:

(1) For a first violation of any part of section 19-508-12 (f), a civil penalty of fifty (50) dollars;

(2) For each successive violation of any part of section 19-508-12 (f), a civil penalty of one-hundred (100) dollars.

Be it known that the within and foregoing regulations are adopted and promulgated by the undersigned pursuant to Sections 19-508 and 22a-6 of the General Statutes and Public Act No. 665 of the 1973 Public Acts after the publication in the Connecticut Law Journal on July 9, 1974, of the notice of the proposal to adopt them, the holding of advertised public hearings on August 8, 1974, on the issuance thereof and after consideration of all relevant matter presented pertaining to Submission of Progress Reports and Assessment of Civil Penalties.

In Witness Whereof, I have hereunto set my hand and seal this 5th day of September, 1974.

ECKARDT C. BECK

Deputy Commissioner

Approved Attorney General, October 31, 1974; Standing Legislative Regulations Review Committee, November 27, 1974. Received and filed: Secretary of the State, December 13, 1974. Effective December 13, 1974.

PART V

OPERATING MANUAL FOR THE APPLICATION OF CIVIL ASSESSMENTS

Covering Department Regulations:

22a-6b-602 - Violation of Air Emissions Standards

22a-6b-603 - Violation of the Terms of an Order to Abate an Emissions Violation

22a-6b-601 - Violation of Progress Report Requirements

ABSTRACT

This manual contains:

- a short description of the Connecticut Enforcement Program
- a step-by-step guide to the application of the Air Compliance civil assessments
- a program guide for civil assessment hearings officers
- a description of how to use surety devices as part of the total enforcement program
- an explanation of how to use and update tools employed in levying civil assessments

IMPORTANT NOTE

This Operating Manual is an Internal Document of the Department of Environmental Protection. It is intended to help DEP staff implement and operate the Department's Civil Assessment Regulations. It can be bound separately from this volume and distributed to operating staff members for easy reference.

NOTHING CONTAINED HEREIN, IN WHOLE OR IN PART, HAS THE FORCE OF LAW. THE APPLICABLE LAW GOVERNING THE ASSESSMENT OF CIVIL PENALTIES IS TO BE FOUND IN THE DEPARTMENT'S REGULATIONS, 22a-6b-100 *et seq.*

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CHAPTER I

THE CONNECTICUT ENFORCEMENT PROGRAM

Over the last decade environmental law and regulation have expanded dramatically. The effectiveness of environmental law enforcement has not kept pace.

Connecticut responded to the need for stronger enforcement with the Enforcement Act of 1973, P.A. 73-665. This law gives the Department of Environmental Protection a wide range of new enforcement powers. Most notably, it authorizes the Commissioner to impose civil assessments in such amounts as will ensure immediate, continued compliance with applicable laws, regulations, orders and permits.

The Department may impose these assessments directly, without first going through the courts. (Everything the Department does under this authority is, however, subject to subsequent court review.) This fact makes the tool practical, credible.

To achieve these ends, the Enforcement Act has entrusted the Department with exceptional power. The Department is charged both with deciding to bring a case and with determining what to do with it. It must exercise this power with great care: it is not a judge and does not have judicial discretion. It must adhere carefully, closely, and in every case both to the specific limitations defined by the Legislature, and to its clear intent to limit the Department's discretion as much as possible consistent with achieving its primary enforcement objective.

The most important of these limitations is the use of economic standards to determine the amount of the assessment in every case. These standards ensure that no person can be charged more than that person has saved from noncompliance. This standard also ensures that the assessment's incentive will be large enough to make compliance pay (and to protect companies that have complied from unfair competition from those that have not.)

The Department's civil assessment regulations provide for assessments equal to the economic benefit a source realizes during each incremental period that it delays or avoids coming into compliance. In effect, they tax away the financial advantages of noncompliance. (Volume I of the Connecticut Enforcement Project's final report, "An Introduction to Connecticut's Economic Approach to Environmental Law Enforcement" gives a broad overview of this economic approach, and Part III of this Volume explains the economics as they apply in Air enforcement in detail.)

In the Air Compliance area, the Department has so far promulgated civil assessment regulations that apply to violations of the requirement that those under order submit progress reports (§601) to violations of existing emission standards (§602), and to failures to comply with the terms of orders to abate illegal emissions (§603).

This Operating Manual is designed to help Department personnel apply these regulations. Chapters II to IV:

- discuss how various operating issues, from warning those who may be liable to collecting unpaid assessments from recalcitrant sources, should be handled for each of the 601-603 regulations;

- provide a series of forms and letters for use in administering each regulation.

Later Chapters cover how to conduct hearings, how to use the Department's power to require sureties, and how to use and update the tools needed for setting accurate economic civil assessments easily.

Volume I of the Enforcement Project's report provides a brief overview of the Department's new economic enforcement approach, including a summary description of how it is applied in all the Department's other program areas. Part I of this Volume provides a fuller description of how this approach is applied in the Air program.

A copy of the Enforcement Act can be found in Volume I, and copies of the Air Compliance civil assessment regulations covered by this Manual are reproduced in Part IV of this Volume.

CHAPTER II

HOW TO APPLY THE 602 REGULATIONS

Section 602 authorizes the Department to impose economic civil assessments on any person who violates Connecticut's particulate, hydrocarbon, carbon monoxide, nitrogen oxides, and sulphur oxides emissions standards. However, the Department will not impose a civil assessment under this regulation as long as the source is moving promptly and effectively to bring its illegal emissions into compliance. Its primary purpose is to enable the Department to make sure, quickly and inexpensively, that noncomplying sources take whatever remedial steps are required without delay.

A. UNDERSTANDING THE SCOPE OF THE REGULATIONS

Any company or premise can have many 602 infractions simultaneously: every machine that emits one of the pollutants covered by the regulation is a separate "unabated activity," and each "unabated activity" is liable for a separate civil assessment, each with separate maxima. The regulations, §22a-6b-602(b)(17), define "unabated activity" as any process or piece of property which

(i) emits or causes to be emitted, any air pollutant in excess of the emission standards prescribed in §19-508-9 and 19-508-18 to 19-508-22, inclusive of the Regulations for the Abatement of Air Pollution; this includes emissions of particulates, carbon monoxide, hydrocarbons, sulfur oxides, and nitrogen oxides;

(ii) is not equipped or operated with the emission controls required by §§19-508-18 to 19-508-22.

Each such process or piece of property is a separate "unabated activity" regardless of the number of identical or closely similar processes or pieces of property owned by the same person or located on the same premises.

Liability under this regulation includes all periods in which a regulatee has failed to incur all the necessary expenses to insure immediate and continued compliance with applicable emission standards. It excludes, however,

(1) The time that a person is under a final order of the Commissioner

(2) the time before these regulations took effect (February 18, 1975)

(3) any time more than two years before a violation is detected.

B. DETERMINING A VIOLATION

The processes of detecting and proving equipment violations of illegal emissions does not vary from current Department practice. A violation of any equipment or emissions standard set forth in §§19-508-18 to 19-508-22 of the Department's Regulations is a 602 violation.

C. APPLYING THE WAIVER PROVISION OF 602(g)(4)

Unless a person responsible for an emissions violation had prior notice of its duty to abate such a violation, it may not be assessed a 602 civil penalty as long as it moves promptly and effectively to come into compliance after it has been detected and put on notice. Section 22a-6b-602(g)(4) defines what constitutes notice and what actions satisfy the "prompt and effective" standard in some detail.

Section 22a-6b-602(g)(4)(iii) provides that the waiver provision does not apply and that a 602 civil penalty may be assessed if any notice has, within 5 years of the date of the detection of the violation, been given the violator in any of the following forms:

(1) a written order, or

(2) a warning letter under §19-508-12(b)(2), or

(3) actual written notice that he has been found in violation of one or more emission standards, or

(4) actual written notice of both the duty to comply with the relevant requirements of the Air Regulations, §§19-508-9 and 19-508-18 to 19-508-22 and of the potential liability to civil assessments for failure to do so.

Note, however, that for such notice to be valid, it must:

(1) be sent by certified mail or personal delivery or service and

(2) have referred to the same regulations that are the subject of the current action.

To be sure, once the Department has undertaken a significant mailing and education campaign, there will be relatively few cases in which this non-imposition or waiver section will apply. In the interim, however, the following procedures should be followed in dealing with a source that can claim coverage by the waiver provision of §22a-6b-602(g)(4)(i) and (ii) because it has not received such notice.

No civil assessment will be imposed on such a source if it takes all steps necessary to bring the unabated activity "promptly and effectively" into continuing compliance with applicable emission standards. Such prompt and effective action must continue either (a) until the source comes under a final order of the Department setting out a binding schedule of compliance steps enforceable by civil assessments authorized by §603, or (b) until actual, full compliance is achieved. Prompt and effective action is specifically defined for the period immediately after detection as follows:

(1) The regulatee must submit an acceptable, detailed written plan of action including a compliance schedule within 40 days of receipt of a warning letter in which the Department requests such a plan.

(2) It need do nothing from the time it submits such an acceptable compliance plan until 5 days after it has been notified of the results of the Department's review of this plan, typically the time it received a DEP order.

(3) Thereafter the source either comes under a DEP order (which, once it is final, ends 602 liability) or it must take whatever steps are appropriate in the circumstances to achieve compliance as quickly and completely as possible. If the source is doing less than what a DEP order would have required of another similarly-situated source, it is very probably not meeting this standard.

If a source qualifies for the waiver provision, the Department should send him warning letter CA-602-W in lieu of an assessment letter.

D. INCLUDING PAST FAILURE TO ABATE

Usually civil assessments run prospectively from the date of detection to the date of compliance. However, the regulation specifically provides that the Department may, under certain circumstances, impose 602 civil assessments that cover past periods of noncompliance which occurred before formal detection. Section 22a-6b-602(h) defines these circumstances as those where:

(1) it is reasonable to assume that the emission violation is the result of a regulatee's past failure to make the control expenditures necessary for compliance, and

(2) the regulatee is not protected by the waiver provisions of (g)(4).

Since there are serious problems in proving past violations, the Department must have a good basis for alleging that a source has not been complying in the period before detection. For example, if the Department finds no control equipment on a rotary kiln, e.g. no scrubber, baghouse, or other control device, there is a clear inference of past violation. On the other hand, if an incinerator's particulate emission is in violation of Department standards because of a bad air mix, the current violation is not adequate proof of past noncompliance. The Department must proceed cautiously in assessing for past delay.

The regulations also impose two restrictions on assessments made for past delay:

(1) No assessment period shall include any time before these regulations became effective,

(2) No assessment period shall include a predetection period greater than two years.

E. CALCULATING AN ASSESSMENT

Civil assessments, which are calculated using the familiar businessman's capital budgeting process, are just large enough to make compliance attractive. Specifically, the civil assessment is calculated to be that payment which, if made at the end of each month throughout a specified period, would have the same net economic impact on a company as the expenditures necessary for compliance with emission standards. While the formula for this calculation is relatively complex (See "Part III - Economics" above), Department staff do not have to understand it to use it. It has been programmed on a Wang Calculator and is easy to use.

For most assessments, only four variables must be determined in order to calculate the amount due. These are:

(1) Equipment costs

(2) Operating costs

(3) The cost of capital for the source's industry, and

(4) In some cases the source's applicable income tax rate.

The precise components of these variables are spelled out in greater detail in the "Definitions" section of the Regulations (see §22a-6b-602(b)). For the purposes of ascertaining these variables for assessment purposes:

(1) Obtain the equipment and operating costs using Chapter VII (A) of this manual, "Calculating the Cost of Compliance."

(2) Obtain the cost of capital for the appropriate industry using Chapter VII (B) of this manual, "Determining the Applicable Cost of Capital."

(3) If the source is a medium or large business (not in an extractive industry) assume a 48 percent effective tax rate; if it is a govenment body or a non-profit institution assume a zero percent rate. Otherwise see Chapter VII (C) of this manual.

To calculate an assessment, write these variables onto the calculation worksheet which follows this section and calculate the assessment by using these variables in the Wang Calculator (See Chapter VII (E) of this manual, "Operating the Wang Calculator.")

THE MONTHLY ASSESSMENT CALCULATED ON THE WANG SHOULD BE MULTIPLIED BY THE PERIOD OF DELAY IN THE ASSESSMENT PERIOD TO ASCERTAIN THE TOTAL AMOUNT OF THE ASSESSMENT THAT WILL BE IMPOSED UNDER THESE REGULATIONS. IF NONCOMPLIANCE CONTINUES, THE FINAL CIVIL ASSESSMENT SHOULD BE DETERMINED BY MULTIPLYING THE MONTHLY ASSESSMENT BY THE ADDITIONAL PERIOD OF NONCOMPLIANCE AND ADDING THIS AMOUNT TO THE AMOUNT ALREADY ASSESSED.

F. MITIGATING AN ASSESSMENT

These economics-based civil assessments are just large enough to ensure immediate and continued compliance with Connecticut's environmental standards. However, there may be specific instances where additional factors may be relevant in determining how large the assessments should be in individual cases. Sections 603(g)(1) and (3) instruct the Commissioner to take any such factor into account and to mitigate any civil assessment upon such terms as he in his discretion deems necessary and proper.

In imposing an assessment under this regulation, attention should be given to determining whether any one or combination of the following facts, on balance, is noteworthy enough to mitigate the assessment amount:

(i) The character and degree of impact the unabated activity has had on the public trust in the air of the State, especially on any rare or unique natural phenomena

(ii) The character and degree of injury to, or interference with, public health, safety, or welfare which is caused or threatened to be caused by the unabated activity

(iii) The conduct of the person incurring the civil penalty in taking all feasible steps or procedures necessary or appropriate to comply or to correct the unabated activity

(iv) Any prior violations by such person of statutes, regulations, orders or permits administered, adopted, or issued by the Commissioner

(v) The economic and financial conditions of such person

(vi) The character and degree of injury to, or interference with reasonable use of property which is caused or threatened to be caused by such unabated activities.

Any mitigating circumstances should be noted in the regulatee's file and brought to the attention of the Director of the Enforcement Section of the Air Compliance Unit who will recommend to the Commissioner the appropriate action to be taken in view of these circumstances. Both the formula assessement and the mitigating circumstances should be formally noted on the "Civil Assessment Checklist", a copy of which follows on page V-17.

G. IMPOSING AN ASSESSMENT

The decision on whether to impose an assessment in an individual case is made at the discretion of the Commissioner, although he may delegate this authority. In any case, the decision to make such an assessment must begin with a recommendation from the Assistant Director for Enforcement. Once this decision has been made, the procedure for imposition is a simple one.

The Department's first step will be to send Assessment Letter CA-602-2 to the violator, CERTIFIED MAIL, RETURN RECEIPT REQUESTED. The date the letter is sent out should be logged on the Civil Assessment Checklist.

As these letters indicate, once the regulatee receives the letter, it has twenty days in which to request a hearing. If the regulatee does not request a hearing within this period, the assessment letter automatically becomes a final order of the Commissioner. The assessment is then payable on the date specified in the assessment letter. The Civil Assessment Checklist can be used to keep track of this 20 day deadline.

H. MANAGING THE HEARING PROCEDURES

Section 22a-6b-101 of the Civil Penalty Regulations defines when a hearing is required, how it must be conducted, and when it may be appealed. Before a hearing is held, be sure to read the guide to conducting hearings, Chapter V of this manual.

The Department should generally be able to avoid hearings by using one of the following devices:

* When a source objects that an assessment is too high, the Department can agree to collect a smaller amount than that assessed that is agreeable to the source. (Civil assessments are due and payable at the time that the order by which they are imposed becomes a final order of the Commissioner. However, the Department can schedule (or postpone) collection over as long a period as it thinks most beneficial -- as long as it charges interest for the value of the deferral to those who receive the benefit.) Postponing the collection of part of the amount assessed does not lower the source's liability, but it is a gesture of reasonableness likely to be rewarded by a gentleman's agreement to avoid a hearing. In negotiating such an agreement, Department staff should make clear that reduced collection (1) does not mean that the assessment has been lowered and (2) that the final amount due will be determined later when adequate information is available. This option entails minimum expense to the Department, allows it to seem reasonable to the regulatee, and still allows it to collect some money immediately.

* If the regulatee forces a hearing, the Department may defer a hearing on the accuracy of the amount of civil assessment if it finds that necessary information is missing but will become available later. (See §22a-6b-602(f)(iv).) Deferral in no way limits the source's ultimate liability.

* The correction procedure can and should be used as an attractive alternative to the hearing process. If a source questions the accuracy of a civil assessment calculation, the Department should make clear that there is a correction-as-of-right procedure which can be followed in lieu of the hearing process.

Any action regarding variable collection or deferral should be clearly noted in the regulatee's file with the reasons the Department took such action.

For a further discussion of variable collection and deferral see Chapter VI.

I. COLLECTING AN ASSESSMENT

The Department does not anticipate having any trouble in collecting civil assessments. Other agencies with similar enforcement programs have not had any trouble in collection and none is expected here. However, for the rare delinquent case, the Enforcement Act provides an easy collection procedure.

If a source does not pay his assessment by the date indicated on his assessment notice, send him the collection letter, CA-602-C, which follows at the end of this section. If payment is not received within three weeks of receipt by the source of the collection letter, the case should be turned over to Mr./Ms.____________ who will refer the matter over to the Clerk of the appropriate Superior Court which will enforce the assessment.

When an assessment is received, the check should be properly logged and delivered to the Department's Bureau of Administration under transfer letter, CA-602-T. The Bureau will have the check deposited in the proper account and will provide you with a receipt for the assessment check which should be placed in the source's file.

J. CORRECTING AN ASSESSMENT

One of the key safeguards built into the regulations is a guarantee that a source can have any assessment lowered if it was based on excessive cost estimates. The source has a right to a reviewable hearing on this issue as soon as it comes into compliance, and the Department may hold such a hearing earlier if it feels this appropriate, given the regulatee's cooperation and the availability of the necessary evidence. Overassessments are returned with interest. This safeguard goes a long way to ensure that assessments are never excessive or uneconomic . It is important to understand that the scope of this correction procedure is fair but narrow:

(1) The only elements of the civil assessment calculus subject to correction are the figures for:

   (a) equipment cost

   (b) operating and maintenance cost

   (c) the assessment period (e.g., if the period of delay turns out to be shorter than that for which an assessment was made)

   (d) depreciable life of the equipment (if a figure other than the 10-year figure authorized in the Regulation is used). The other elements of the assessment calculus, e.g., the rate of inflation, are not subject to the correction procedure.

(2) Only "hard evidence" will be accepted to substantiate claims for correction. This means that in most cases actual purchase vouchers or similar invoices will be required as evidence that actual compliance costs were less than those estimated by the Department for the purpose of making an assessment. Since purchasers can easily obtain proof of purchase from vendors such evidence should be required. The reviewing engineer should carefully scrutinize correction applications to make sure that they include all elements of cost that were considered in making the initial assessment. (See Chapter VII (A) of this manual.)

K. FORMS AND LETTERS: THE 602 REGULATIONS

The following forms and letters should be used for applying civil assessments for violations of emission standards:

- * 602 Assessment Checklist
- * General Notice of Civil Assessment Letter (CA-602/603-GN)
- * Assessment Warning Letter (CA-602-W)
- * Assessment Letter (CA-602-A)
- * Collection Letter (CA-602-C)
- * Letter Explaining Factors Used in Assessment Calculation (CA-602/603-FAC)
- * Correction Letter (CA-602/603-COR)
- * Transfer Letter (CA-602/603-T)
- * Refund/Denial Letter (CA-602/603-R)

Copies of these forms and letters may be found on the following pages.

CIVIL ASSESSMENT CHECKLIST: SECTION 602

§ of Manual		Initials
	Name of Source:	
	Violation Detected By:	
	Violation Detected On:	
II (C)	Waiver Provisions Applicable? ☐ Yes ☐ No	
II (C)	Warning Letter (CA-602-W) Sent On:	
II (C)	If Waiver Provisions Apply, Date on Which Source Fails to Meet Compliance Obligations of 602(g)(4): Note Reason:	
II (D)	Period of Violation in Months:	
II (E)	Assessment Variables	
	Equipment Cost: Operating Cost: Cost of Capital: Income Tax Rate:	
II (E)	Monthly Liability:	
II (E)	Assessment Equals:	
II (F)	Mitigating Circumstances, if any:	
II (F)	If Mitigation Occurs, It Was Noted in the Monthly Report of:	
II (G)	Assessment Letter (CA-602-A) Sent Certified Mail On:	
II (G)	Return Receipt Shows Receipt By Source On:	
II (G)	Twenty Days After Receipt Is:	
II (H)	Request for Hearing Received by Above Date: ☐ Yes ☐ No	
II (I)	Payment Received On:	
II (I)	Collection Letter Sent On:	
II (I)	Collection Referred On:	
II (J)	Request for Correction Received On:	
II (J)	Correction ☐ Granted ☐ Refused On:	
	Payment Sent to the Bureau of Administration On:	

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

SUBJECT: Liability for Monetary Assessments

Dear ____________________;

The Department of Environmental Protection has been enforcing Connecticut's air quality emissions standards since 1972. These standards attempt to strike the most effective balance in protecting the health, safety, and economic well-being of Connecticut's citizens.

Over 96 percent of Connecticut's known sources of air pollution are now in compliance. In fairness to those who are in compliance, and in order to ensure that Connecticut's environmental laws are respected, the Commissioner of Environmental Protection has been authorized to make money assessments against those that are not in compliance with applicable emissions standards or abatement orders. So that these assessments will be large enough to ensure "immediate and continued compliance," they have been designed to remove any economic incentive to delay coming into compliance.

As the owner of a source of air pollution, you are liable for any violations of emission standards or for any delinquency in meeting the terms of a state order that develop after the effective date of this new assessment authority, February 18, 1975. This liability is in addition to the Commissioner's other enforcement powers: to require and cause the forfeiture of sureties and to refer violators to a prosecutor or the Attorney General for criminal and/or civil action.

We are enclosing copies of the state regulations that

(1) define what you must do to avoid liability for such assessments. (Regulations for the Abatement of Air Pollution, §§19-508-9 and 19-508-18 to 19-508-22, including amendments to §19-508-12(f).)

(2) explain your potential assessment liability for violating any of these standards. (Enforcement Regulations, §§22a-6b-100 to 22a-6b-102 (procedure) and 22a-6b-601 to 22a-6b-603 (failure to file required progress reports, violations of emissions standards, and failure to comply with the terms of an order). The maximum amount you may be assessed for each month of emission or order violations is listed in the table in §22a-6b-602(d).)

If you wish to discuss these regulations or have any questions, please do not hesitate to call the Air Compliance Enforcement Section at 566-3160.

Thank you for your help in creating and maintaining a better environment for Connecticut.

Sincerely,

Henry Beal
Director of Air Compliance

Enc.

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

NOTICE OF EMISSIONS VIOLATION: WARNING LETTER

NOTICE NO. ___________

VIOLATION: §19-508-__________

Dear

The Commissioner of Environmental Protection has determined that you are now in violation of the above-mentioned regulation governing emission standards. For this violation you are liable to civil penalties to be assessed pursuant to Department Regulations 22a-6b-100 et seq. However, under the terms of the Department's Regulations, you may be able to avoid imposition of the penalties if you take prompt and effective action to bring your currently unabated activity into compliance with applicable standards.

Specifically, you will be deemed to have taken prompt and effective action if you

(a) submit a detailed written plan of action including a timetable which, once implemented, will achieve compliance as promptly and effectively as possible, and

(b) submit this plan within 40 days of receipt of this letter, and

(c) either consent to a compliance order issued by the Department, or independently take all steps necessary to achieve prompt, continuing, effective compliance.

If you do not meet these standards of performance, the "second chance" waiver provisions of the Department's Regulations will not apply and the Commissioner will proceed to impose an assessment against you.

If you have any question concerning this notice, please contact M __________ of the Air Compliance Unit Enforcement Section at 566-3160.

Sincerely,

Henry Beal
Director of Air Compliance

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

CIVIL ASSESSMENT NOTICE

No. 2-______________

TO:

RE: Premise Name

Premise Address

The Commissioner of Environmental Protection has determined that you are now in violation of the below-mentioned Regulation governing emission standards. Therefore, pursuant to the provisions of Department Regulations 22a-6b-100 et. seq., this letter constitutes notice of the violation, a statement of the amount of civil assessment(s) to be imposed for this violation, and a statement of your right to a hearing.

VIOLATION: The Commissioner has determined that you have now been in violation of §____________ of the Department's Administrative Regulations for the Abatement of Air Pollution for a period of ______ months.

ASSESSMENT: You are hereby notified that you have been assessed $___________ for this period of violation. Furthermore, for each additional month until you are either in compliance or operating under the terms of a State Order, the Commissioner will impose an additional assessment of $___________ per month.

HEARING: You have a right to a hearing on this assessment. To request a hearing you must deliver to the Commissioner or the Director of Air Compliance a written application for hearing within twenty days of the receipt of this notice.

PAYMENT: Unless a hearing is requested, this notice shall become a final order of the Commissioner twenty-one days after the date of receipt. Payment of the civil assessment shall be due twenty-five days after receipt of this notice. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to the:

Assistant Director of Air Compliance Enforcement
Department of Environmental Protection
165 Capitol Avenue -- Room 133
Hartford, Connecticut 06115

If you have any questions concerning this notice, please contact the Assistant Director at the above address or, by phone, at 566-3160. All correspondence should be identified with the Civil Assessment Notice Number (see top right-hand corner).

________________________ __/__/__ ________________________ __/__/__
Signed (Assistant Director) Date Signed (Director) Date

SERVICE

A copy of the foregoing Notice was submitted to the above-named as indicated below:

☐ Personally delivered to ____________________ ________________________ __/__/__
Recipient's Signature Date

☐ Certified mail to the usual place of business or residence. Registration No.:________________

__/__/__
RPD

Town________ Premise__________ AQCR_________ NEDS County_______ EPA 100T Premise: ☐ Yes ☐ No

Reg.#________ Yr_____ Day_____

CA-602-A (PE1102 6/13/75))

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Subject: State Order No. ____________
Violation Notice No. _______

Dear

The Department of Environmental Protection has found that you were violating the State's emissions standards and has consequently imposed a civil assessment on you pursuant to Department Regulation 22a-6b-602. Notice of the violation and the consequent civil assessment was sent to you by certified mail on _____________________.

☐ Since you did not request a hearing, this notice became a final order of the Commissioner on ___________________.

☐ This notice became a final order of the Commissioner after hearing on ____________________.

Payment of the assessment was due on _____________________ and is now over three weeks late.

The law provides that, if the assessment is not paid promptly, it may be enforced in the same manner as a judgment of the Superior Court. Accordingly, if we do not receive your payment, the Commissioner will file his final order with the Clerk of the Superior Court, whereupon his civil assessment order will have the same status as a judgment of the Superior Court and will be enforced by the Sheriff accordingly.

We expect to receive your delinquent payment no later than ____________________. If we do not receive payment from you by that time, we will be compelled to institute proceedings with the Superior Court.

If you have any questions concerning this letter, please feel free to contact me at 566-3160.

Sincerely,

Assistant Director,
Air Compliance Unit,
Enforcement Section.

CA-602-C

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Subject: State Order No. ______________

Reference: Your Request of ____/____/____

Assessment Notice No. ______________

Dear

In response to your request pursuant to §22a-6b-602(e)(3) or 603(e) for a written explanation of the methodology used to determine your assessment, we enclose the Department's "Calculating Economic Remedies".

The variables used to calculate your assessment in the manner described in this document are as follows. (Please refer to Enforcement Regulations §22a-6b-602(b) for definitions of these variables):

"Equipment Costs": ______________________

"Operating Costs": ______________________

"Inflation": ______________________

"Depreciable Life": ______________________

"Cost of Capital": ______________________

If you have any further questions concering the assessment calculation, please do not hesitate to contact M
__________ of the Enforcement Section at 566-3160.__________

Sincerely,

Assistant Director,
Air Compliance Unit,
Enforcement Section.

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Your Ref.:

Notice of Violation No.:

Dear

This letter is written in response to your inquiry regarding possible correction of the amount of the civil assessment imposed upon you.

Department Regulations 22a-6b-602(g)(2) and 603(g)(2) provide that a regulatee in receipt of a civil penalty notice of violation may petition the Commissioner for correction of a civil assessment imposed upon him any time up to two years after the Commissioner finds the regulatee has come into compliance.

The regulation requires that your petition be in writing, setting forth any evidence that the cost of compliance has been or will be less than the Commissioner had initially determined in imposing the civil assessment. Such a petition must be sent by certified mail or by personal service to the Commissioner or the Director of Air Compliance.

The Commissioner may, in response to the petition, or on his own behalf, lower an assessment he determines was excessive. If the Commissioner takes no action in response to such a petition, or if his response is not satisfactory to you, you may obtain a hearing of right once you come into compliance or at any other time specified in a final order. Following such a hearing, the Commissioner must correct the civil assessment if and to the extent that the actual cost of compliance has been less than he had initially determined. If you are not satisfied with this decision, you may then appeal it to the courts.

Any refunds to be made to you under this regulation shall be made with interest calculated at the same cost of capital rate used to make the civil assessment.

If you have any questions concerning this letter or the nature of the correction procedures under the Regulations, please contact me at 566-3160.

Sincerely,

Assistant Director,
Air Compliance Unit,
Enforcement Section.

CA-602/603-COR

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Source: ______________________________

Civil Assessment Notice No. ___________

Amount of Payment: $___________________

Bureau of Administration, Financial Services
Department of Environmental Protection
Room ______

The attached check represents payment by the above-named source for a civil assessment imposed pursuant to the Department's regulations 22a-6b-100 et seq.

☐ There remains a possibility that all or part of this check may have to be paid back to the issuer with interest. Therefore, please deposit this check into the civil assessment pending receipts fund and return a receipt of such deposit to me.

☐ The issuer of this check has no further opportunity to appeal or seek correction of the assessment that gives rise to this payment. Please deposit the check into the General Fund and return a receipt of such deposit to me.

Sincerely,

____
Air Compliance Unit,
Enforcement Section.

CA-602/603-T

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Your Ref.: ______________________________

Notice of Violation No.: _____________

Dear

Pursuant to the correction procedures provided by Department Regulations 22a-6b-602(g)(2) and 603(g)(2), the Commissioner has considered the evidence you have presented in your written petition for correction.

The Commissioner has

☐ determined that your assessment will be lowered by the amount of $__________. A check for this amount, with interest, is enclosed with this letter.

☐ determined that your assessment for each month of continuing violation shall be reduced from __________ to __________.

☐ determined that the initial civil assessment imposed upon you is correct and that your petition for correction is hereby denied for the reason(s) here described:

If you have any questions concerning this letter or the correction proceedings, please contact me at 566-3160.

Sincerely,

Assistant Director,
Air Compliance Unit,
Enforcement Section.

CA-602/603-R

CHAPTER III

HOW TO APPLY THE 603 REGULATIONS

Section 603 authorizes the Department to impose civil assessments on those who fail to comply with the terms of an order.

A. UNDERSTANDING THE SCOPE OF THE REGULATION

All orders issued pursuant to §§19-508-9 and 19-508-18 to 19-508-22 of the Department's Regulations, inclusive, which have become final either by the passage of time or by the consent of the regulatee or after hearing, can be enforced under this regulation.

Most violations will be defined in terms of failing to comply with a deadline established in the order's compliance schedule, be it the final date for meeting emissions standards or one of the intermediate steps. Within reasonable limits, partial nonperformance is a full violation. However, as the following example indicates, falling behind in an order's compliance schedule is a single violation.

Example:

Consider the case of a source with the following compliance timetable and actual compliance dates:

Step	Action	Scheduled Compliance Date	Actual Compliance Date	Civil Assessment Imposed
1:	Hire Engineer	Month 2	Month 4	Yes
2:	Order Equipment	Month 3	Month 5	No
3:	Receive Equipment	Month 9	Month 14	Yes
4:	Install and Operate Equipment	Month 12	Month 17	No

A civil assessment imposed for noncompliance with Step 1 covers a two month violation. While Step 2 is also completed two months behind schedule, this is not a new violation for it is the same two months delay incurred in meeting Step 1.

However, when Step 3 is completed five months late, a new violation (an additional delay of three months) has occured and a new civil assessment can be imposed. Similarly, if final compliance occurs with this same five months delay, there is no new violation. Thus, the 603 regulations impose assessments only for the total cumulative delay in meeting a compliance timetable.

B. MEASURING THE PERIOD OF DELAY

The amount a source has saved by not complying with the terms of an order is a direct function of how long the source has delayed and therefore so is its civil assessment liability. This makes determination of the time a source is behind schedule critical to calculating civil assessments.

The period of delay is measured as the length of time between the date of scheduled compliance and actual compliance. It can be measured for interim steps in the order schedule and/or for the final compliance deadline. If civil assessments are tied to the final deadline only, the Department does not have to worry about calculating cumulative delay step by step or about having to make refunds with interest in the event the source catches up some of the time it lost in earlier steps. (If the source has been assessed early in its schedule and then "catches up" all or part of the delay before the final compliance deadline, the Department is required to repay a proportionate share of the assessment with interest.) However, especially for recalcitrant sources that do not react to warning letters, imposing an assessment on an intermediate step may be useful.

Since the regulations speak in terms of maximum MONTHLY assessments, time periods of delay should be measured in months or fractions of months. For ease of calculation, monthly periods of delay should be expressed in fractional equivalents, e.g., 10 days = 10/30 = .33 months.

Excluding Delay Before February 18, 1975

The Department is not including delay accrued before the effective date of the 603 regulation, February 18, 1975, in the assessment period used in calculating civil assessments. This poses special problems during the first year or two of the regulation's use.

To measure the assessment (or violation) period for sources that were under order before February 18, 1975, EXCLUDE THE CUMULATIVE DELAY THAT OCCURRED PRIOR TO THIS EFFECTIVE DATE. For such sources, civil assessments will apply only to any incremental delinquency that develops after February 18, 1975. For example:

> Source A is on a compliance timetable which commenced on January 1, 1974. Step 6 of the order, requiring the issuance of purchase orders, was due on September 1, 1974, but was not completed until December 1, 1974 (3 months behind schedule). When the source reaches step 10 of the order, requiring the installation of equipment on May 1, 1975, he is still 3 months behind schedule. He does not install the equipment until August 1, 1975 and thus completes his compliance timetable three months late. However, since this source was under order before the effective date of the regulation, his cumulative delay which occurred before that date is to be subtracted from the total period of delay. Here, since there was no increment of delay after February 18, 1975, there will be no civil assessment applied to this source.

Delays Verifiably Beyond The Source's Control

The regulations's purpose is to ensure that order recipients exercise diligence, competency, and urgency in complying with the Department's orders. Delays that the source could not have foreseen or avoided and that can be verified if claimed are therefore excluded from the period of delay that defines civil assessment liability by §603(g)(3). This Section provides that the Commissioner must exclude from the assessment period any delay which is caused:

* by strikes or lockouts; riots, wars, or other acts of violence; floods, hurricanes, or other Acts of God; or other equally severe, unforeseeable and uncorrectable accidents; or,

* by delays attributable to the Air Compliance Unit of the Department in excess of routine processing times.

None of these mandatory exclusions can become a loophole for the relatively few willful, dishonest scofflaws with whom the Department must deal. Every mandatory exclusion, if claimed, can be easily verified by the Department. If a source claims that a strike prevented him from complying, one or two phone calls can confirm whether or not there was a strike.

Unverifiable grounds for exclusion are specifically not covered by §603(g)(3). In particular, THIRD PARTY SUPPLIER DELAY IS A DISCRETIONARY GROUNDS FOR MITIGATION ONLY. Such grounds are not covered because, if they were, they could be turned into a major loophole by recalcitrant sources willing to lie because the Department generally would not be able to disprove such claims.

Although the regulation had to be drafted tightly to deny such a loophole to these few sources, the Department will continue to grant extensions for third party delay and other reasons not covered by §603(g)(3) when in its judgment such action is warranted.

If a source claims a reduction in its assessment period because of excessive processing delay by the Department, the Department should compare the actual time taken in handling the case with the routine times required for handling the average case reported in Parts II (Baseline Profile) and VI (Administrative Costs) in this Volume.

C-G. ASSESSING, REVIEWING, AND COLLECTING A 603 FORFEITURE

Sections 602 and 603 are extensions one of the other. The moment a source comes under a final order it exchanges §602 liability for potential §603 liability. They are both based on identical economics, have closely similar safeguards, and operate under almost the same procedures. Consequently, most of the operating guidelines outlined in the last Chapter for §602 also apply to §603.

* A day's delay in compliance before a final order has the same value to the source as a day's delay after the order is final. The value of the delay, and the amount of the assessment are therefore calculated identically. The 602 and 603 calculations require exactly the same information regarding equipment costs, operating costs, and industry cost of capital. They use exactly the same assessment formula. See Chapter II (E) above.

* The Enforcement Act requires the Department to consider mitigation based on the same list of criteria in both cases. See Chapter II (F).

* The procedures for imposing, reviewing, collecting, and correcting assessments are all identical. See Chapter II (G, H, I, and J).

D. FORMS AND LETTERS: THE 603 REGULATIONS

Because §603 is so similar to §602, it is possible to use identical forms and letters for most purposes. Commom forms and letters carry the identification in the lower right-hand corner, "CA-602/603-__." They are not reproduced here but will be found in the earlier 602 "Forms and Letters" section of this manual. The forms and letters needed to implement the 603 regulations are listed below.

* 603 Assessment Checklist
* General Notice of Civil Assessment Letter (CA-602/603-GN)
* Assessment Letter (CA-603-A)
* Collection Letter (CA-603-C)
* Letter Explaining Factors Used in Assessment Calculation (CA-602/603-FAC)
* Correction Letter (CA-602/603-COR)
* Transfer Letter (CA-602/603-T)
* Refund/Denial Letter (CA-602/603-R)

CIVIL ASSESSMENT CHECKLIST: SECTION 603

§ of Manual		Initials
	Source: ________________________	
	State Order No.: ________________________	
III (A)	Step No. Scheduled For: ________________________	________
III (B)	Period of Delay Up To Today: ________________________	________
	Does Order Include A Warning? ☐ Yes ☐ No	________
	Warning Letter CA-603-W Sent On: ________________________	________
III (B)	Reduction in Period of Delay for Delay Beyond Regulatee's Control? ☐ Yes ☐ No	________
III (C)	Assessment Variables	
	Equipment Cost: ________________________	
	Annual O & M Cost: ________________________	
	Cost of Capital: ________________________	
	Income Tax Rate: ________________________	
III (C)	Monthly Liability: ________________________	________
III (C)	Assessment Equals: ________________________	________
III (C)	Mitigating Circumstances, If Any: ________________________ ________________________ ________________________	________
III (C)	Mitigation, If Any, Was Noted In The Monthly Report of: ________________________	________
III (C)	Assessment Letter CA-603-A Sent By Certified Mail On: ________________________	________
III (C)	Return Receipt Shows Receipt By Source On: ________________________	________
III (C)	Twenty Days After Above Date Is: ________________________	________
III (C)	Hearing Requested Within Above Period: ☐ Yes ☐ No	________
III (C)	Payment Received On: ________________________	________
III (C)	Collection Referred On: ________________________	________
III (C)	Request for Correction Received On: ________________________	________
III (C)	Correction ☐ Granted ☐ Refused On: ________________________	________
	Payment Sent to the Bureau of Administration On: ____________	________

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

CIVIL ASSESSMENT NOTICE

No. 3 -__________

TO:

RE: Premise Name

Premise Address

The Commissioner of Environmental Protection has determined that you are now in violation of the terms of the above-named State Order. Pursuant to the Department Regulations 22a-6b-100 et. seq., this constitutes notice of the violation, a statement of the amount of civil assessment(s) to be imposed for this violation, and a statement of your right to a hearing:

VIOLATION: Your State Order binds you to meet all scheduled dates of the compliance timetable embodied in the Order. As of the date of this letter you are:

________ months behind schedule for Step Number ____ of the compliance timetable and are thus in violation of the terms of the Order.

ASSESSMENT: You are hereby notified that you have been assessed $_________ for this period of delinquency. Furthermore, for each incremental month that you fall behind schedule after this date, the Commissioner will impose an additional assessment of $________ per month.

HEARING: You have a right to a hearing on this assessment. To request a hearing you must deliver to the Commissioner or the Director of Air Compliance a written application for hearing within twenty days of the receipt of this notice.

PAYMENT: Unless a hearing is requested, this notice shall become a final order of the Commissioner twenty-one days after the date of receipt. Payment of the civil assessment shall be due twenty-five days after receipt of this notice. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to the:

Assistant Director of Air Compliance Enforcement
Department of Environmental Protection
165 Capitol Avenue -- Room 133
Hartford, Connecticut 06115

If you have any questions concerning this notice, please contact the Assistant Director at the above address or, by phone, at 566-3160. All correspondence should be identified with the Civil Assessment Notice Number (see top right-hand corner).

________________________ / / ________________________ / /
Signed (Assistant Director) Date Signed (Director) Date

SERVICE

A copy of the foregoing Notice was submitted to the above-named as indicated below:

☐ Personally delivered to ________________ ________________ / /
Recipient's Signature Date

☐ Certified mail to the usual place of business or residence. Registration No.:________________

/ /
RPD

Town__________ Premise__________ AQCR__________ NEDS County__________ EPA 100T Premise:__________

☐ Yes ☐ No

Reg. #_______ Yr_____ Day_______

CA-603-A (FE1102 (6/13/75))

Copies: 1) Regulatee 2) Air Quality Enforcement

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Subject: State Order No. __________
Violation Notice No.________

Dear

The Department of Environmental Protection has determined that you were not in compliance with the terms of a final order of the Commissioner and has consequently imposed a civil assessment on you pursuant to Department Regulation 22a-6b-603. Notice of this violation and the consequent civil assessment was sent to you by certified mail on ______________________________.

☐ Since you did not request a hearing, this notice became a final order of the Commissioner on ____________________.

☐ This notice became a final order of the Commissioner after hearing on ____________________.

Payment of the assessment was due on ____________________ and is now over three weeks late.

The law provides that if the assessment is not promptly paid, it may be enforced in the same manner as a judgment of the Superior Court. Accordingly, if we do not receive your payment, the Commissioner will file his final order with the Clerk of the Superior Court. Upon such filing, the order will have the same status as a judgment of the Superior Court and will be enforced by the Sheriff accordingly.

We expect to receive your delinquent payment no later than _______________. If we do not receive payment from you by that time, we will be compelled to institute proceedings with the Superior Court.

If you have any questions concerning this letter, please feel free to contact me at 566-3160.

Sincerely,

Assistant Director,
Air Compliance,
Enforcement Section.

CA-603-C

CHAPTER IV

HOW TO APPLY THE 601 ASSESSMENT

Section 601 authorizes the Department to impose civil assessments in the event that an order recipient fails to submit progress reports as required. The assessments are small and, unlike those authorized by §§602 and 603, do not vary from case to case.

A. UNDERSTANDING THE SCOPE OF THE REGULATION

DEP Regulation 19-508-12(f) requires that any person against whom a final order has been issued shall submit progress reports on the status of such order, and it defines in detail what progress reports must contain, what form they must take, what supporting evidence they must provide, and when they must be submitted. These standards will be further expanded in the terms of the order. (A copy of this regulation is reprinted on the back of form CA-601-W (FE-1106 (6/25/75)), which may be found in "Forms and Letters" section which follows.)

A §601 civil assessment may be imposed in either of the two following situations:

(1) If a source fails to submit a progress report on time he has violated the regulation. For the purposes of Department administration, however, a grace period of one week after the due date of a progress report will be permitted.

(2) If a source fails to submit a complete progress report: e.g., if he fails to meet any of the requirements stated in 19-508-12(f)(2)-(4), or in his order, he has violated the regulation. However, since the Department's interest is to receive complete progress reports rather than to apply civil assessments, every effort should be made to educate a source as to the progress report requirements before you seek sanctions. Warning letter 601-W may be used for this purpose.

B. IMPOSING AN ASSESSMENT

Section 22a-6b-601 provides for the imposition of 2 levels of civil assessment for violation of the progress report requirements:

(1) for a first violation, an assessment of fifty (50) dollars;

(2) for each successive violation, an assessment of one hundred (100) dollars.

If you determine that a source has violated the progress report requirement:

(1) Check its file to see if it has previously been assessed under this regulation. If the source has no previous history of delinquency, send it a warning letter, CA-601-W.

(2) If the source has already received a warning letter on this matter, and if this is a first-time violator, send it assessment letter CA-601-A by certified mail, return receipt requested.

and

Place a copy of the assessment letter and the certified receipt in the "Assessment Notices Outstanding" file, now kept by Mr./Ms.______________.

(3) If the source has not requested a hearing twenty days after it received the letter, the letter automatically becomes a final order of the Commissioner. If payment is not received by the 25th day after receipt, you should send the source the letter of collection, CA-601-C.

C. MANAGING HEARING PROCEDURES

The Regulations, (§22a-6b-101(b)) provide that a person may, within twenty days after receipt of the assessment letter, deliver to the Commissioner a written application for a hearing. Given the small size of the assessment, and the generally undisputed nature of a violation of this sort (either a progress report was filed or it was not filed), the Department does not expect to entertain many applications for hearings to contest 601 assessments.

However, if a source does request a hearing, you should follow the hearing procedures that are outlined in Chapter V of this operating manual.

If a hearing is held, and the Commissioner does not decide to reverse the finding of a violation, you will be notified by the hearing officer that you can proceed with the collection procedures outlined below.

D. COLLECTING AN ASSESSMENT

Particularly when the amounts due are as small as 601 assessments, the Department does not anticipate having any trouble with collection. Other agencies with similar enforcement programs have not had any trouble, and none is expected here. However, for the rare delinquent case, the Enforcement Act provides an easy collection procedure.

If a source does not pay his assessment by the date indicated on his assessment notice, send him the collection letter, CA-601-C. If payment is not received within three weeks of receipt by the source of the collection letter, the case should be turned over to Mr./Ms. _______________ who will refer the matter over to the Clerk of the appropriate Superior Court which will enforce the assessment through the Sheriff.

When an assessment is received, the check should be properly logged and delivered to the Bureau of Administration's Office of Financial Services under the transfer letter that is attached at the end of this section. The Bureau will have the check deposited in the proper account and will provide you with a receipt for the assessment check which should be placed in the source's file.

E. FORMS AND LETTERS: THE 601 REGULATIONS

The following forms and letters should be used in applying the civil assessments for violations of the progress report regulations:

- 601 Assessment Checklist
- Assessment Warning Letter (CA-601-W)
- Assessment Letter (CA-601-A)
- Collection Letter (CA-601-C)
- Transfer Letter (CA-601-T)

Copies of these forms and letters may be found on the following pages.

CIVIL ASSESSMENT CHECKLIST: SECTION 601

§ of Manual		Initials
	Name of Source: ____________________	
	State Order No.: ____________________	
IV (B)	Progress Report Due On: ____________________	________
	Is Now More Than One Week Late ☐ Yes ☐ No	________
	Progress Report Inadequate Because: ____________________ ____________________ ____________________	________
IV (B)	This is a ☐ First ☐ Subsequent Violation	________
IV (B)	Assessment Letter (CA-601-A) Sent By Certified Mail On: ____________________	________
IV (B)	Date Return Receipt Signed by Source: ____________________	________
IV (B)	Twenty Days After Receipt Is: ____________________	________
IV (C)	Request For Hearing Received By Above Date: ☐ Yes ☐ No	________
IV (D)	Payment Recieved On: ____________________	________
IV (D)	No Payment Received on Schedule	
	Collection Letter Sent On: ____________________	________
	Collection Referred On: ____________________	________
IV (D)	Payment Sent Bureau of Administration On: ____________________	________

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STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING • HARTFORD, CONNECTICUT 06115

____

____
____
____
____

SUBJECT: Monetary Liabilities for Progress Report Deficiencies

Dear M . ____________________:

Progress Reports are required as an integral part of your State Air Compliance Order because they are essential to monitoring progress. Tardiness and inadequacy of Progress Reports are, therefore, detrimental to Connecticut's air pollution abatement program. For this reason, the Legislature has passed enabling legislation authorizing the Department to impose monetary assessments to curb such deficiencies. A copy of the Department's applicable regulations is printed on the reverse side (or enclosed).

In the case of your State Order No. ________:

☐ We have not received the Progress Report which was due on __/__/__.

☐ We thank you for your Progress Report dated __/__/__; HOWEVER,

- ☐ Please use our Form FE306 for all future Progress Reports (copy enclosed).
- ☐ Please refer to the "Compliance Timetable". Each element of your Progress Report should be identified with the pertinent "Step" number listed on the Timetable.
- ☐ Please refer to the "Compliance Timetable". When any "Step" of the Timetable has been completed (entirely), your Progress Report should indicate "Step No. __ was completed on (Date) ". On your next Report, please bring us up-to-date by reporting which "Steps" have been completed (entirely completed) since the inception of this Order.
- ☐ You neglected to include a concise but comprehensive description of
  - ☐ the specific reasons for tardiness
  - ☐ the current state of completion
  - ☐ the special action which will be taken to return "on-schedule" by the date of the next Progress Report
  - ☐ YOU ARE REQUIRED TO SUBMIT A SPECIAL REPORT ON THIS SUBJECT BY __/__/__.
- ☐ Please address Progress Reports precisely as indicated at the top of Progress Report Form FE306.
- ☐ Please send copies of all Progress Reports to ______________________________
  ____
- ☐ ______________________________
  ____

We would appreciate your cooperation; but must caution you that any future deficiencies may cause the Department to impose civil assessments in accordance with Section 22a-6b-601.

Sincerely,

Donald M. Helfer
AIR COMPLIANCE UNIT
ENFORCEMENT CONTROL CENTER

566-3160

cc: Assessment Follow-up Program

CA-601-W

(FE-1106 (6/25/75))

V-40 (a)

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ADMINISTRATIVE REGULATIONS

Regulations and notices published herein are printed exactly as submitted by the forwarding agencies. These, being official documents submitted by the responsible agencies, are consequently not subject to editing by the Commission on Official Legal Publications.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Submission of Progress Reports and Assessment of Civil Penalties

Section 1. Section 19-508-12 of the Regulations of Connecticut State Agencies is amended by adding a new subsection (f) as follows:

Sec. 19-508-12. Violations and enforcement

(f) **Progress report requirements.** (1) Requirement, time, form. Any person against whom a final order has been issued shall submit progress reports as required and prescribed by the terms of the order. Such progress reports shall be submitted in such a form as the commissioner prescribes.

(f) (2) Contents. Progress reports shall contain a separate declaration for each required step of an order's compliance timetable, stating either that compliance with the step is on schedule, or that compliance with the step is off schedule. Progress reports declaring that compliance is proceeding on-schedule shall contain a concise but comprehensive description of (1) the action completed on each and every step required by the order during the time period covered by the report, and (2) the date or dates on which compliance with such step or steps was completed. Progress reports declaring that compliance is proceeding off-schedule shall contain a concise but comprehensive description of (1) the specific reasons for the tardiness, (2) the current state of completion, and (3) the special action which will be taken to return "on schedule" by the date of the next progress report. Progress reports shall contain such other information as the commissioner may require by the terms of a final order.

(f) (3) Proof of compliance. Progress reports shall include the name and address of any vendor whose goods were ordered for compliance purposes since the prior progress report. Where the terms of an order reported upon require the purchase of any material, service or equipment, progress reports shall include copies of the purchase order or orders. The commissioner may require such other proof as he deems necessary to determine the progress and degree of compliance.

(f) (4) Verification of contracted work. Progress reports shall include the name and address of any consultants, subcontractors, or other agents employed under the terms of the order since the prior progress report together with a concise but comprehensive description of the actions they are to take to assist in compliance with the orders. Whenever any vendor, consultant, subcontractor or other agent is undertaking any activity regarding any step in the order, the progress report shall include a verification by the person under order that the vendor, consultant, subcontractor, or other agent is proceeding on-schedule.

(f) (5) Liability. Any person required to submit progress reports shall be liable for failure to meet any of the requirements of this section notwithstanding any delegation of responsibility to an agent to complete and submit reports. Any person who files a progress report containing false or misleading information or other claims shall be subject to criminal prosecution pursuant to section 53a-157 of the General Statutes.

Assessment of Civil Penalties

Sec. 22a-6b-100. Title

Section 22a-6b-100 to 22a-6b-900, inclusive, shall be known and may be cited as "Civil Penalty Regulations."

Sec. 22a-6b-101. Enforcement proceedings

(a) If the commissioner has reason to believe that a violation has occurred for which a civil penalty has been established, he may send to the violator by certified mail, return receipt requested, or by personal service, a notice which shall include:

(1) A reference to the section of the statute, regulation or order involved;

(2) A short and plain statement of the matters asserted or charged;

(3) A statement of the amount of the civil penalties to be imposed upon finding after hearing that a violation has occurred or upon a default;

(4) A statement of the party's right to a hearing.

(b) The person to whom the notice is addressed shall have twenty days from the date of receipt of the notice in which to deliver to the commissioner written application for a hearing. If a hearing is requested then, after a hearing and upon a finding that a violation has occurred, the commissioner may issue a final order assessing a civil penalty under this section which is not greater than the penalty stated in the notice. If such a hearing is not so requested, or if such a request is later withdrawn, then the notice shall, on the first day after the expiration of such twenty day period or on the first day after the withdrawal of such request for hearing, whichever is later, become a final order of the commissioner and the matters asserted or charged in the notice shall be deemed admitted unless modified by consent order, which shall be a final order. Any civil penalty may be mitigated by the commissioner upon such terms as he in his discretion deems proper or necessary upon consideration of the factors set forth in section 2 (h) of Public Act 73-665.

(c) Final orders assessing civil penalties not appealed pursuant to section 2 (f) of Public Act 73-665, as amended, shall be filed for execution pursuant to section 2 (h) of Public Act 73-665, as amended. Such final orders do not waive or forsake any other remedies or powers the department may have with regard to the matter in question.

Sec. 22a-6b-102. Conflict and severance

(a) The provisions of this section are in addition to and in no way derogate from any other enforcement provisions contained in any statute administered by the commissioner. The powers, duties and remedies provided in such other statutes, and the existence of or exercise of any powers, duties remedies hereunder or thereunder shall not prevent the commissioner from exercising any other powers, duties or remedies provided herein, therein, at law or in equity.

(b) The invalidity of any word, clause, sentence, section, part or provision of these regulations shall not affect the validity of any other part which can be given effect without such invalid part or parts.

Civil Penalty Regulations for Air Compliance

Sec. 22a-6b-600. Title

Sections 22a-6b-600 to 22a-6b-900 inclusive, shall be known and may be cited as "Civil Penalty Regulations: Air Compliance."

Sec. 22a-6b-601. Violation of progress report requirements

When, following hearing or default, the commissioner determines that a person has failed to submit a progress report in compliance with the requirements of section 1 -508-12 (f), and that mitigating circumstances do not justify waiver or reduction of penalties, the commissioner may issue or make final an order, assessing a civil penalty according to the following schedule:

(1) For a first violation of any part of section 19-508-12 (f), a civil penalty of fifty (50) dollars;

(2) For each successive violation of any part of section 19-508-12 (f), a civil penalty of one hundred (100) dollars.

Be it known that the within and foregoing regulations are adopted and promulgated by the undersigned pursuant to Sections 19-508 and 22a-6 of the General Statutes and Public Act No. 665 of the 1973 Public Acts after the publication in the Connecticut Law Journal on July 9, 1974, of the notice of the proposal to adopt them, the holding of advertised public hearings on August 8, 1974, on the issuance thereof and after consideration of all relevant matter presented pertaining to Submission of Progress Reports and Assessment of Civil Penalties.

In Witness Whereof, I have hereunto set my hand and seal this 5th day of September, 1974.

[illegible] C. Borg

Deputy Commissioner

Approved: Attorney General, October 31, 1974; Standing Legislative Regulations Review Committee, November 27, 1974. Received and filed: Secretary of the State, December 13, 1974. Effective December 13, 1974.

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

CIVIL ASSESSMENT NOTICE

No. 1-____________________

TO:

RE: Premise Name — State Order No.

Premise Address — Progress Report Due

The Commissioner of Environmental Protection has determined that you are now in violation of the progress report requirements specified in §19-508-12 of the Department's Administrative Regulations for the Abatement of Air Pollution (hereinafter "Regulations") and/or in the referenced State Order. Pursuant to the provisions of Department Regulations 22a-6b-101 et. seq., this letter constitutes notice of the violation, a statement of the amount of civil assessment(s) to be imposed for this violation, and a statement of your right to a hearing:

VIOLATION: The Progress Report Regulations provide that any person against whom an order has been issued shall submit progress reports as required and prescribed by the terms of the order. The referenced progress report

☐ has not been received on time.

☐ has been received, but does not meet the requirements of §19-508-12(f) and/or the order because:

ASSESSMENT: Since this is

☐ an initial violation, you are hereby assessed a civil assessment of fifty dollars ($50). For any subsequent violation of this regulation, you will be assessed a civil assessment of one hundred dollars ($100).

☐ a repeat violation, you are hereby assessed a civil assessment of one hundred dollars ($100). For any subsequent violation of this regulation, you will be assessed additional assessments of one hundred dollars ($100).

HEARING: You do have a right to a hearing on the issue of whether the violation has occurred. To request a hearing, you must deliver to the Commissioner a written application for hearing within twenty days of the receipt of this notice.

PAYMENT: Unless a hearing is requested, this notice shall become a final order of the Commissioner twenty-one days after the date of receipt. Payment of the civil assessment shall be due twenty-five days after receipt of this notice. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to the

Assistant Director of Air Compliance Enforcement
Department of Environmental Protection
165 Capitol Avenue -- Room 133
Hartford, Connecticut 06115

If you have any questions concerning this notice, please contact the Assistant Director at the above address or, by phone, at 566-3160. All correspondence should be identified with the Civil Assessment Notice Number (see top right-hand corner).

______________________ / / ______________________ / /
Signed (Assistant Director) Date Signed (Director) Date

SERVICE

A copy of the foregoing Notice was submitted to the above-named as indicated below:

☐ Personally delivered to ____________ ____________ / /
Recipient's Signature Date

☐ Certified mail to the usual place of business or residence. Registration No.:____________

/ /
RPD

Town________ Premise________ AQCR________ NEDS County________ EPA 100T Premise ☐ Yes ☐ No

Reg.#________ Yr.______ Day______

Copies: 1) Regulatee 2) Air Quality Enforcement

CA-601-A (FE1102 (6/13/75))

V-42

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Subject: State Order No. ____________

Violation Notice No. ________

Dear

Pursuant to Department Regulations 22a-6b-601, the Department has imposed upon you a civil assessment for violation of the Progress Report Regulations set forth in 19-508-12(f). Notice of the violation and the assessment was sent you by certified mail on ______________________.

☐ Since you did not request a hearing, this notice became a final order of the Commissioner on ________________.

☐ This notice became a final order of the Commissioner after hearing on ______________.

Payment of the assessment was due on ________________ and is now over three weeks late.

The law provides that if the assessment is not paid promptly, it may be enforced in the same manner as a judgment of the Superior Court. Accordingly, if we do not receive your payment, the Commissioner will file his final order with the Clerk of the Superior Court. Upon such filing, the Clerk will docket the order in the same manner and with the same effect as a judgment of the Superior Court. Upon such docketing, the order will be enforced by the Sheriff as a judgment of the Superior Court.

We expect to receive your payment no later than __________. If we do not receive payment from you by that time, we will be compelled to institute proceedings with the Superior Court.

If you have any questions concerning this letter, please feel free to contact me at 566-3160.

Sincerely,

Assistant Director,
Air Compliance,
Enforcement Section.

CA-601-C

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Source: ____________________

Civil Assessment Notice No. ____

Amount of Payment: $ __________

Bureau of Administration, Financial Services
Department of Environmental Protection
Room ______

The attached check represents payment by the above-named source for a civil assessment imposed pursuant to the Department's Regulations 22a-6b-100 _et_ _seq_.

Please deposit the check into the account of the State's General Fund and return a receipt of such deposit to me.

Sincerely,

Assistant Director,
Air Compliance,
Enforcement Section.

CHAPTER V

HOW TO CONDUCT HEARINGS IN CIVIL ASSESSMENT CASES

Sources who receive notices of violation imposing civil assessments have 20 days from the date of receipt to request a hearing on the proposed assessment. The scope of the hearing will of course depend on the nature of the violation.

601 ASSESSMENTS

For the 601 Assessments (Progress Reports), a party requesting a hearing can contest:

(1) Whether, as alleged, the progress report in question was delinquent or not received at all; or

(2) Whether, as alleged, the progress report was incomplete or otherwise failed to satisfy the substantive requirements for progress reports as set forth in Department Regulations 19-508-12(f) or in the regulatee's order.

Since these are relatively clear-cut issues, and since the amounts in question are small, hearings on the 601 assessments are not expected to occur very often. Nonetheless, when such hearings are requested, the Department must demonstrate to the satisfaction of the hearing officer that:

(1) The regulatee was at the time of the alleged progress report violation subject to a state order containing progress report requirements; and

(2) The regulatee failed to submit a progress report on time or failed to submit a complete progress report on time.

In meeting these burdens of proof, the hearing officer can reasonably expect the Department (probably a member of the Enforcement Unit) to produce:

(1) The state order pursuant to which the progress report in question was or was not submitted;

(2) Any communications, or notations thereof, with the source which discussed progress reports including but not limited to:

   (a) notes from telephone calls or meetings at which progress report requirements were discussed;

   (b) copies of letters, including any notice or warning letters, in reference to progress report requirements;

(3) A signed statement from the engineer in charge of the progress reports either that no progress report was received as required by the order or that the progress report was incomplete. If the assessment is being made for incompleteness, this statement should include a detailed listing of the reasons the progress report did not meet the requirements of the regulations. IN LIEU OF SUCH STATEMENT, THE RESPONSIBLE ENGINEER SHOULD HIMSELF BE PREPARED TO TESTIFY AT THE HEARING.

Since this evidence is important to support the Department's case, it is important that the responsible Department personnel carefully keep all relevant notes and documents in the regulatee's file.

602 ASSESSMENTS

For the 602 Assessments (Emissions Violations), a party requesting a hearing can contest:

(1) Whether, as alleged, an emissions violation has occurred;

(2) Whether the civil assessment to be imposed for the alleged illegal emission is correct.

The threshold question on a 602 assessment is whether or not the violation of the emission standards took place at all. This issue is the same one that may be presented to the Department in other contexts; e.g., a challenge to the legality of an abatement order where the fact of the emissions violation is in dispute. Since the question of the underlying emissions violation is identical for both abatement order challenges and civil assessment challenges, the hearing officer should either: (1) consolidate both challenges so they can be heard together, or (2) advise the parties during the first hearing that he will apply his finding on the underlying emissions violation to the second hearing, thereby pre-empting it as an issue in the second hearing.

The first procedure is easier and simpler, and probably should be used most often. If the hearing officer adopts the second procedure, he must be sure in the second hearing to rule that his finding on the emissions violations from the first hearing is binding on the second hearing (even if there are additional parties in the second hearing). Incidentally, if an attorney uses the term res adjudicata or res judicata, he is referring to the binding effect in the second hearing of a finding in the first hearing concerning an identical issue of fact or law.

On the issue of whether an emissions violation has taken place, the Department should be prepared to have the Engineer(s) or Inspector(s) who noted the violation present to the hearing officer, in person or in a written statement, a detailed description of the date of his inspection(s) and/or observation(s), the method of his detection of the violation, the precise nature of the violation (quantitative description if possible) and the nature of his post-inspection report(s) to the Department.

With regard to the amount of the assessment, the Department must demonstrate that the amount is reasonable. The Department must establish:

(1) The number of separate processes or pieces of equipment that contribute to the emissions violation. This number establishes the number of "unabated activities," which in part determines the maximum assessment. The hearing officer's task is to judge the reasonableness of the Department's separation or aggregation of processes and equipment into unabated activities.

(The Department may choose to aggregate processes and equipment into fewer unabated activities, in order to avoid the task of identifying separate ones. The Department has the authority to do this (§22a-6b-602(b)(17), and since the result will be to lower the maximum assessment, the regulatee is not likely to object. If an intervenor objects to such aggregation, the hearing officer should first determine whether or not it makes any difference. As long as the assessment does not run into a ceiling no harm has been done and the aggregation can be left undisturbed. However, if equipment costs and operating costs for an unabated activity drive the maximum monthly assessment into one of the starred boxes in the 602 schedule of maximum assessments, and if the unabated activity has been aggregated from separate processes and equipment, the hearing officer should press the Department to defend its position.

The test is whether or not one or more of the constituent processes or pieces of equipment emits pollutants if operated alone.)

(2) The operating parameter(s) or other basis(es) from which equipment and operating costs were estimated. Here, the hearing officer must judge the reasonableness of the Department's cost-estimation by evaluating the Department's determination of the operating level for each unabated activity, and by checking that the Department has properly used the appropriate cost curve or other costing technique. (Usually, the operating parameter will be gas flow in CFMs. Since equipment and operating cost estimates must be made for each unabated activity, a separate gas flow must be calculated for each one. This may involve the Department's allocating to separate unabated activities the gas flow through a single stack, or aggregating gas flows from several stacks which vent a single unabated activity).

(3) The inflation rate, cost of capital, and equipment life figures used to calculate the assessment. The hearing officer's task is to judge (a) whether the inflation rate was selected and calculated in accordance with §602(b)(13), using either the Chemical Engineering Index or another index, (b) whether the regulatee is a member of the class covered by the cost of capital figure the Department calculates, and (c) whether the average equipment life of the control equipment, if the Department has used a figure different from the 10-year period specified in the regulation, is reasonable.

(4) Accurate assessment calculations using the above numbers. The hearing officer's job here is to judge whether the Department properly calculated the monthly assessment.

(5) The length of the violation. The hearing officer must determine whether the Department has adequately demonstrated when the emissions violations began. A showing that the source was in operation at the time claimed and did not have necessary control equipment in place will generally be adequate.

In meeting these burdens, the Department will probably present as evidence:

(1) Testimony and documents (registration statements, PIQs, inspection reports, etc.) identifying separate processes and pieces of equipment and the pollutants and levels of polluted emissions produced by each in order to establish the number of unabated activities.

(2) The operating parameters from which the assessments were calculated. This usually will include the CFM rate, production per hour, and whatever other parameter is used in the cost function. This information is usually taken from the source's registration statement and, when this is so, the registration form itself should be produced and included in the record. Similarly, if the information is contained on a Pre-Inspection Questionnaire, the PIQ itself should be produced.

(3) A copy of the cost curves upon which the assessment was based. This can usually be produced by having a copy of the appropriate curves and backup materials from Chapter VII (Section A) of this Volume, plus a file of any calculations that have been done to update these curves, available for inspection, with relevant portions copied and introduced for the record. Special note should be made of the sources from which the cost curves were developed and how they were verified with specific cases.

(4) A copy of the materials on the cost of capital, inflation, income tax rates, and equipment life found in Chapter VII (and Part III of this Volume), together with testimony explaining how they were used in the particular case at issue.

(5) A copy of the Wang calculator print-out recording the calculation of the assessment level. A copy of the detailed explanation of the formula used to determine assessments found in Chapter I of Part III of this Volume should also be included in the record.

(6) A showing of when the illegal emissions began and were first assessable. Proof that a source was in operation on the first day alleged, e.g. by showing that it was listed in the preceding year's Connecticut Directory of Manufacturers or had been the subject of an earlier DEP inspection, should be enough. If the source

> alleges it had adequate control equipment in place and consequently was not emitting illegally, the Department must show that the alleged equipment either was not there or that it was inadequate. It can require the company to show purchase receipts for the alleged equipment if necessary.
>
> If the Department seeks to include a period of noncompliance prior to its having detected the violation directly, the Department must also show that the source had, before the first day for which it is to be assessed, notice of its potential §602 liability or was a repeat violator. A file memo recording personal service, the returned receipt from a notice sent by certified mail, or other Departmental records evidencing prior enforcement action(s) of a similar nature would have to be introduced into the record.

The Department may take the position at a hearing that not enough information is available at that time to calculate the monthly assessment with reasonable certainty, and it may accordingly request that the question of assessment calculation be deferred until more data becomes available (e.g., from an engineering report). In this situation, the hearing officer may make findings and a decision as to the other issues (such as emissions violations) in the case, and postpone part of the hearing under Section 602(f)(iv).

Deferring part of a hearing under 602(f)(iv) postpones a final decision by the Commissioner, and thus also postpones a regulatee's right to appeal. Postponement provides valuable time for the Department to gather cost information to demonstrate the reasonableness of a proposed assessment. This extra time also brings a cost: the Department cannot collect any assessment without a final decision. These conflicting pressures -- more time at the cost of delayed collection -- will probably work to keep the Department's use of postponement in balance. Nevertheless, excessive delay can seriously impair a regulatee's right to appeal; the hearing officer, therefore, must be sensitive to undue delay in each case. Generally, (1) waiting until an engineering report is available is reasonable, (2) delays over a year are suspect and require strong justification.

The hearing officer should also be aware of the correction procedure in §602(g)(2). This enables a regulatee to obtain adjustment of any final assessment if it can demonstrate that its cost of compliance or the assessment period were less than the Department had assumed in determining the assessment initially. Once the source has come into compliance, it has a right to such a correction. Any overassessment will be repaid with interest.

This adjustment of an otherwise final assessment may take place months after the assessment, indeed up to two years after final compliance. The availability of this procedure allows the hearing officer to give the Department more leeway in calculating the monthly assessment and in determining the assessment period, since both can be corrected later.

603 ASSESSMENTS

For the 603 Assessments (Order Violations), a party requesting a hearing can contest:

(1) Whether, as alleged, there has been a violation of the terms of the order, and/or

(2) Whether the civil assessment proposed by the Department is correct.

The threshold question on a 603 violation is whether or not a source has failed to comply with the terms of its order. The usual context for a violation is a source failing to meet the scheduled compliance deadlines embodied in the order. Such failures are easy to demonstrate: If the source has failed to meet one of the compliance deadlines in its order, it is in violation. Was the baghouse in place by June 13th as required or not? (The regulations allow only a few, easily verifiable excuses for missing a deadline available as defenses -- wars, strikes, fires, floods -- but not third party delay.) (See Section 603 (g)(3).)

To establish a violation, the Department must show:

(1) That the regulatee was at the time of the alleged delinquency under an order;

(2) That the regulatee failed to meet a scheduled deadline;

(3) That the regulatee has been delinquent for at least as long a period as the assessment period used to calculate the civil assessment.

The Department will probably meet its burden by producing:

(1) The state order involved in the case;

(2) Any correspondence concerning the compliance deadline in question, or any other evidence of communications with the source concerning the compliance timetable. Such evidence may include but need not be limited to:

a. notes from telephone calls or meetings with the source at which the compliance deadline was discussed,

b. copies of letters, including any warning or notice letters in reference to compliance with scheduled order deadlines.

(3) The civil assessment regulation limiting the acceptable excuses for delay;

(4) Evidence of the period of noncompliance, e.g. the report of an inspector that he visited the site 6 months after the deadline and did not find the equipment in place as required. This information is critical since the amount of the assessment is directly proportional to the period of delay. (This issue can be especially troublesome in the first few months of the program since the effective date of the regulations occurs in the middle of some already delinquent orders. In these cases the regulations allow the Department to assess a regulatee for the total number of days of overrun beyond any compliance schedule deadline that falls due after the regulations become effective -- i.e. for all accumulated delay. However, as a matter of policy, the Department intends to assess only for incremental delay beyond the regulation's effective date. See Chapter III Section B of this manual for directions on measuring the period of delay.)

Whether the amount of the civil assessment is correct or not turns on exactly the same issues and should be handled in exactly the same way as a challenge to the amount of a 602 assessment would be. (See the last section of this Chapter.)

CHAPTER VI

HOW TO USE SURETY DEVICES AS PART OF THE OVERALL ENFORCEMENT PROGRAM

Section 22a-6(7) of the General Statutes gives the Department the authority to require the posting of performance bonds or other sureties as a means of ensuring prompt and effective compliance with environmental regulations. The Department has already had significant success with the use of penalty or forfeiture bonds and anticipates expanding the application of these devices. It is important to understand the nature of different kinds of sureties since each can play a useful role in a total enforcement program.

SURETY DEVICES: SOME DEFINITIONS AND AN EXPLANATION

A performance bond is a bond posted by a surety company which guarantees the performance of an agreed-upon action (e.g. the installation of a piece of pollution control equipment) by an agreed-upon date. If the bonded company or individual fails to perform as required, the guarantor is responsible for the performance. (The guarantor, of course, has recourse against the failing company or individual.) Such guarantor responsibility can take one of two forms:

(1) In some cases the surety company is itself responsible to complete the required job. Because of the complexities of installing pollution control equipment, few if any surety companies are willing to accept liability on this basis.

(2) In the more usual case, performance bonds guarantee that if performance is not completed as required, a set amount of money necessary to achieve compliance will be paid to the party owed the performance. In such cases, however, the party owed the performance must then complete the performance himself.

Obviously, the Department would not want to be put in the position of being responsible for completing pollution control installation. Accordingly, performance bonds will normally not be appropriate for Department enforcement activity.

A penalty or forfeiture bond is a bond posted by the regulatee or a surety company which guarantees that a set sum of money will be forfeited if an agreed-upon action is not performed. A typical penalty bond in the environmental setting would provide that if installation of a certain piece of pollution control equipment is not completed by a certain date, a set amount of money in the form of a "penalty" would be forfeited to the Department. Such "penalty" or "forfeiture" does not extinguish the obligation of the bonded party to complete performance; it does penalize him for not complying as required on time. The Department has already had some notable successes with the use of penalty or forfeiture bonds. Companies having a significant financial stake in prompt compliance, even if previously afflicted with recurrent extraordinary delays, have suddenly found the means to meet deadlines.

An escrow is similar to a bond in that money is pledged to guarantee an obligation to perform a duty. An escrow agreement differs from other sureties in that no surety company is involved. Instead, the party guaranteeing the performance is the party who must carry out the performance. Such guarantee usually takes the form of the company placing assets (usually cash, treasury notes, or other similarly liquid assets) in an account managed by an escrow agent. The escrow agent merely holds the assets and either (1) returns them to the pledging party if performance is achieved, or (2) transfers them on demand to the party owed the obligation if performance is not achieved. An escrow account has particular advantages in cases where bonding companies are unwilling to provide guarantees. In addition, since the costs of retaining an escrow agent (usually a bank) are significantly less than those for hiring a surety company, the costs of such a guarantee are more easily afforded by all types and sizes of regulatee.

A flexible reserve escrow is a variation of the escrow agreement. It differs from the usual escrow arrangement in that the party owed the performance has the option of allowing the performing party to post only a portion of the total escrow amount in the account at any one time. Thus, an escrow agreement might call for placing $48,000 with an escrow agent. If the agreement were for a flexible reserve escrow, the party owed performance could allow a smaller amount to be posted. While the party owed performance could require the full $48,000 to be put in the account at any time, it could agree not to do so if certain requirements were met or for as long as it felt that the work owed it was proceeding well. Thus, while a company might normally have to post $48,000, the Department could require that only, say, $4,800 be put in the account. This kind of flexible reserve escrow leaves the regulatee liable to the Department in full if it fails to perform, but cuts the cost to the company by, in this example, 90 percent.

USING SURETIES:
SOME EXAMPLES

Suppose polluting company A, found in violation of the particulate emission standards, has been required by state order to achieve compliance by April 1, 1976. If the Department is concerned about its meeting the deadline because of schedule lag, it could require the company to post any of the following sureties:

(1) The Department could require a performance bond for a face amount of up to $48,000 -- the cost of compliance. If compliance is not achieved on April 1, 1976, the Department can demand as much of the $48,000 amount as would be required for the Department to complete the compliance. As noted above, however, the Department does not want to be responsible for this work. Consequently, this bond option will normally not be used.

(2) The Department could require a penalty or forfeiture bond. The face amount of this bond would also be for $48,000 -- the total cost of compliance. The terms of the bond, however, could provide that it would be forfeited for delays in compliance at a rate equal to the civil assessment which would be imposed for a similar period of delay or non-compliance.

Thus, if a source who fell behind schedule by four weeks would normally be liable for an assessment equal to $4000 according to the terms of the Department's civil assessment regulations, the bond could call for the forfeiture of $4000 per four week period of delay.

(3) The Department could require an escrow account to be created. The amount of the escrow could again be the $48,000 cost of compliance. The company would then be required to place that amount into an account held by the escrow agent (usually a bank) under an agreement which calls for forfeiture payments for delays in compliance. Again, the amount of the forfeiture could be tied to the civil assessment which would be imposed in such a case. In our hypothetical example, the amount forfeited from the escrow account would be $4000. If no delay were incurred, the party would have the full amount of the escrow account returned to him upon

completion of the necessary work. Because an escrow account held by a bank can continue to earn interest for the party posting the escrow, the cost of such a device can be very small -- the difference between the source's cost of capital and the return on Federal notes (roughly 3 percent to 6 percent) plus $200-$300 in service charges.

(4) The Department could require that a flexible reserve escrow account be set up. Such an account would rest upon an agreement which (1) recognized that the company posting the escrow could be required to post the full amount of the escrow ($48,000) at any time, but would be permitted to post such smaller amounts as the Department required from time to time, and (2) provided for the forfeiture of such amounts in the escrow account at a rate determined by the comparable civil assessment which would be imposed for such a source's delay. If the regulatee fell further behind schedule, the Department could require it to increase the proportion of its total potential liability placed with the escrow agent; if a regulatee made up lost time, the Department could cut the amount it had previously required be posted. This device would allow the Department to communicate warnings and encouragements to those about whose performance it is concerned with great flexibility and ease. (The regulatee cannot contest any of these requirements since it has already agreed to post the full amount on demand.)

ECONOMIC SURETIES

Sureties should be set according to the same economic logic as civil assessments. Forfeitures should counterbalance the benefits of noncompliance, and the amount of the surety the Department may require should be large enough to cover such forfeiture payments over the number of months they might reasonably be necessary. (Probably one year's worth of monthly economic assessments will be enough.)

There are two chief reasons why sureties should follow the same economic logic as economic assessments. First, by doing so they obtain all the objectivity, fairness, and effectiveness -- and therefore useability -- of economic civil assessments. Second they can be made to mesh with economic assessments into a coordinated, multi-step enforcement process that will give the Department greatly improved flexibility and enforcement cost effectiveness.

This close fit between sureties and assessments is especially critical since sureties are ultimately enforceable under the Department's civil assessment powers. Regulatees will agree to post sureties as the less costly of evils when offered the choice of doing so or of paying a full assessment. Moreover, if a regulatee is still not in compliance once the amount placed with the escrow agent is exhausted, the Department can impose a civil assessment for the period beginning the day that escrow payments are no longer possible at the same rate as before.

USING SURETIES

Sureties work. Requiring regulatees to post sureties induces immediate action. This has been the experience both within and without the Department. In 1974, the Air Compliance Unit imposed penalty bonds on several of its most troublesome sources; and, in every case, these sources either came promptly into compliance or any further delay they experienced was insignificant compared with their past records.

Given that sureties are effective, it makes sense for the Department to require one of the four types of surety outlined above before imposing civil assessments in many cases. Requiring a regulatee to accept that the Department can (1) require it to freeze a portion of its assets in a low-yielding escrow account at will until it is in full compliance,and (2) make it forfeit some or all of this amount in the event of delay or noncompliance -- even if it costs the regulatee almost nothing -- is a step no regulatee can ignore. On the other hand, because it is clearly a much less severe step than others available to the Department, notably that of imposing a civil assessment, the Department can require sureties without having to face lengthy negotiations or much risk of a contest. In other words, using sureties first will generally be less expensive for the Department as well as for the regulatee.

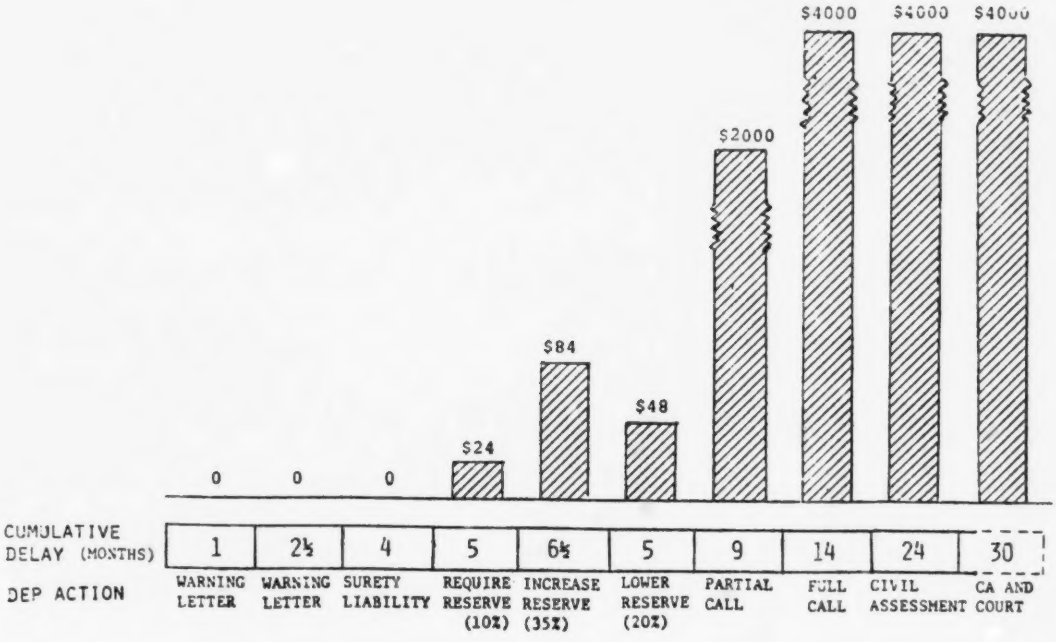
There are, of course, cases where requiring a surety is either not possible or unwise. Violations not discovered until after the fact cannot be prevented by requiring that a surety be posted in advance. Some offenses are too small to be worth such preventive care, and the repeat offender may merit no more "second chances."

The several types of surety offer a wide range of choice of severity of response. Merely requiring a regulatee to accept surety liability costs the regulatee almost nothing economically. Requiring it to post 10 percent reserve under a flexible reserve escrow costs only symbolically more. However, requiring a performance bond can be a significant expense.

These several types of surety fit together with the Department's administrative civil assessments to provide a highly flexible set of gradually escalating enforcement steps the Department can take. They pick up at the point where requesting compliance proves inadequate and build up to the point where drastic, penal sanctions that can only be imposed by a court become necessary.

The following diagram illustrates how the Department can use flexible reserve escrows and administrative civil assessments together to obtain a wide choice of finely gradated responses. Given these tools it can adjust the amount of pressure it applies to a noncomplying regulatee as needed.

Monthly Cost to the Recalcitrant Regulatee of Possible DEP Enforcement Actions (Assumes a $48,000 Escrow)



In the hypothetical and unusually recalcitrant case shown in the diagram, the Department could escalate its response easily and very flexibly (see diagram). It could issue a warning letter to the regulatee as soon as a problem was detected, and, upon receiving no adequate response, it could issue another one month to two months later. After the fourth month of delay it might require the regulatee to accept a flexible reserve escrow liability of, say, $48,000. Assuming another month's delay, it could require that the regulatee post 10 percent of that amount, i.e., $4,800. Assuming a difference of 6 percent between the cost of capital and the return on short-term Federal paper, the source would incur an opportunity cost of $24 per month ($4,800 X .06 X 1/12). In succeeding months, the Department could increase or lower the reserve requirement depending upon the regulatee's good faith and performance. If delay persisted into, say, the ninth month, the Department could demand partial (e.g., 50 percent) forfeiture, in which case the source would incur a monthly cost of approximately $2,000. Further delay would eventually result in full forfeiture, in this example, $4,000 a month. If delays continued for more than a year, the amount posted with the escrow agent would be exhausted and the Department would have the option of either negotiating a second surety arrangement or imposing an immediate civil assessment. In the extraordinarily unlikely event that the regulatee still refused to comply, the Department would still be able to seek more extreme sanctions from the court.

It should be stressed that the above illustration is not only hypothetical, but highly unlikely. The potency of the surety device is such that only an unusual source would allow his delay to persist after having signed a document acknowledging liability to a possible surety forfeiture.

However, the Department must take care to avoid imposing more than one surety requirement or a surety requirement and a civil assessment simultaneously. Any such "double counting" would risk an ultimate judicial characterization of the Department's new tools as punitive, criminal, and invalid.

The Department will have to decide situation by situation which of the various forms of surety and whether requiring a surety or using some other enforcement tool is appropriate. Among the questions it will want to ask when making this choice are the following:

- What has the source's past compliance record been? "Bad actors" may merit more severe responses earlier in the enforcement process than the average case.

- Is an urgent matter of public health or permanent environmental damage at stake? If so, the Department may want to use more drastic tools earlier than otherwise.

- Why is this regulatee not complying as it should? If the problem is uncooperative lower management, requiring a surety from the firm will effectively force top management to take notice of the problem.

- Can the regulatee easily obtain coverage by a surety company -- and at what price? Surety companies are notoriously conservative, especially in areas where performance involves technologies with which they are unfamiliar -- very much including pollution abatement. Only very large, well-financed companies can be sure of obtaining coverage, and even some very large firms will have to post one hundred percent security with a bonding company and still pay a fee. Smaller companies, let alone individuals or partnerships, may not be able to obtain a bond from a surety company -- or if they are able to do so, they will have to pay extraordinary interest charges. For such a regulatee, it may only be reasonable to require one of the escrow forms of surety.

Much of the choice of option will, of course, ultimately turn on the judgments Department administrators make while negotiating with regulatees. They will have to decide "What type and what level of incentive will work best with this fellow?"-- just as they must decide how to handle each problem case now. However, with the Department's new tools, there will henceforth be many more responses possible.

WRITING SURETY AGREEMENTS

A surety requirement is an extremely flexible enforcement device. Although it can easily be routinized, it can also be modified to fit individual cases if the unit so desires. When the unit negotiates surety terms with a regulatee, it has all the freedom of contract, and since the agreement _is_ a contract, all terms will be binding.

The Department can write any provisions it can negotiate with the regulatee into its surety agreements. These provisions will generally cover what is required of the regulatee (referencing, e.g., the terms of an order), what events will allow the Department to require a forfeit, how much the total surety amount should be and how much would be forfeited in what events, when the surety liability will end (typically whenever the regulatee is in full compliance, e.g. with the order), and who the escrow agent will be.

When the Department requires an escrow, it will want to define what types of assets are acceptable security. Although, again, it is free to accept whatever security it feels appropriate case by case, it will almost always want to limit what a regulatee can post with the escrow agent to:

(1) cash

(2) U. S. Treasury notes

(3) Connecticut State bonds.

Other assets, e.g. accounts receivable or corporate securities are generally not acceptable because (1) they are less liquid, and (2) their value is less certain and more likely to fluctuate.

Individual surety companies and escrow agents typically have their own forms. These are usually acceptable to the Department.

* * * * * * * * * * * * *

Sureties provide an extraordinarily flexible, low cost, and effective first response to noncompliance when persuasion and warnings do not prove adequate.

CHAPTER VII

HOW TO USE AND UPDATE TOOLS EMPLOYED IN LEVYING CIVIL ASSESSMENTS

Economic assessments have to be reasonably accurate. Getting the right assessment is critical to the assessment's effectiveness, equity, and ability to withstand court challenge.

This chapter spells out how Department staff should go about calculating assessments in order to get reliable results at acceptable cost. (Part III of this Volume explains the economics underlying these assessments -- what the theory is, what factors must be considered, and how these factors are to be used.) The chapter is divided into five main sections, each explaining how the Department would go about using or updating tools employed in levying civil assessments.

* Section A explains how to determine the cost of compliance in every type of case likely to be an enforcement problem. It includes a series of cost curves that can be used to provide acceptably accurate cost estimates for most cases in minutes.

* Section B explains how to determine the cost of capital for each case.

* Section C spells out how to update the inflation factor in the assessment formula from time to time.

* Section D explains how to adjust the assessment formula for sources with income tax rates less than 48 percent.

* Finally, Section E outlines how to use the assessment formula tape on a Wang desk calculator.

SECTION A

CALCULATING THE COST OF COMPLIANCE

The most critical single piece of information* needed to set economically accurate civil assessments is a reliable estimate of the cost of compliance (chiefly the costs of installed capital equipment and of annual operating and maintenance). This chapter explains and provides the tools DEP staff will need to make good estimates quickly.

The Department must be able:

- to make reliable estimates of the cost of compliance in order (1) to ensure that civil assessments are large enough to be effective but not excessive and (2) as a result, to ensure a successful legal defense in the event of a court challenge;
- to do so in a visibly non-arbitrary manner, both to ensure case-by-case equity in fact and to protect the Department against legal challenge; and
- to do so quickly and with acceptably limited administrative costs.

Department engineers could estimate the cost of compliance case-by-case with information that is routinely available now. In a test conducted in September of 1974, using actual Connecticut case files, DEP Air Compliance Enforcement Section engineers were able to obtain accurate estimates in 1 to 14 hours a case. (The results varied with the complexity of the case and with the stage of the enforcement proceedings at which the costing had to be done. The earlier in the process it had to be done, e.g. after the initial field inspection rather than after final compliance, the more time the work required because less information was available.) A survey of private consulting engineers using the same cases confirmed the results of the test. (However, because of their greater day-to-day experience with costing, the private engineers took somewhat less time.)

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* A full explanation of the effect of taxes, depreciaiton, cost of capital and inflation on the level of civil assessment is set forth in Chapter I, "Calculating Civil Assessments."

Although an average cost of 5 hours on a case of average complexity with only an engineering report in hand would be manageable given the significant impact on overall compliance and the net reduction in administrative costs effective economic remedies would make possible, it is still a major expense. The technique outlined in this chapter saves 90 percent of that cost.

For most cases, Department staff will be able to determine the costs of compliance simply by reading one of the cost curves in this chapter. These curves relate the costs of compliance to the number of cubic feet per minute (CFM) of polluted emissions that must be processed by a given technology. Given the CFM rate, which is almost always already available, and these curves, the costs of compliance can be reliably estimated in minutes.

These cost curves come from two main sources: (1) a series of EPA and private studies*, and (2) actual Connecticut case experience. Most of the curves were developed initially outside Connecticut, but most have been tested against and confirmed by the Connecticut case data. The costs reported by these curves are, by their nature, general or average costs. They do not take into account the value of materials recovered by pollution control devices. While this value may be significant in a few cases, such valuation cannot be undertaken by other than case-by-case study. These costs also exclude any special specifications which may be required for extraordinary installations (e.g., stainless steel scrubbers). Any further exclusions are specifically noted.

This chapter first presents these cost curves along with annotations by type of pollutant (i.e. particulates, organics, carbon monoxide, nitrogen oxides, and sulfur oxides) and method of control chosen (e.g. baghouse, scrubber). The Section presenting the curves begins with equipment costs and then provides annual operating and maintenance costs. The chapter's second main section discusses enforcement cases not covered by the curves presented in the first section. Several addenda to the chapter provide supporting data.

The DEP staff wishes to express their appreciation for the hard work and patience of James Vickery, Principal Engineer of the Air Compliance Enforcement Unit. This Section is largely a product of his efforts.

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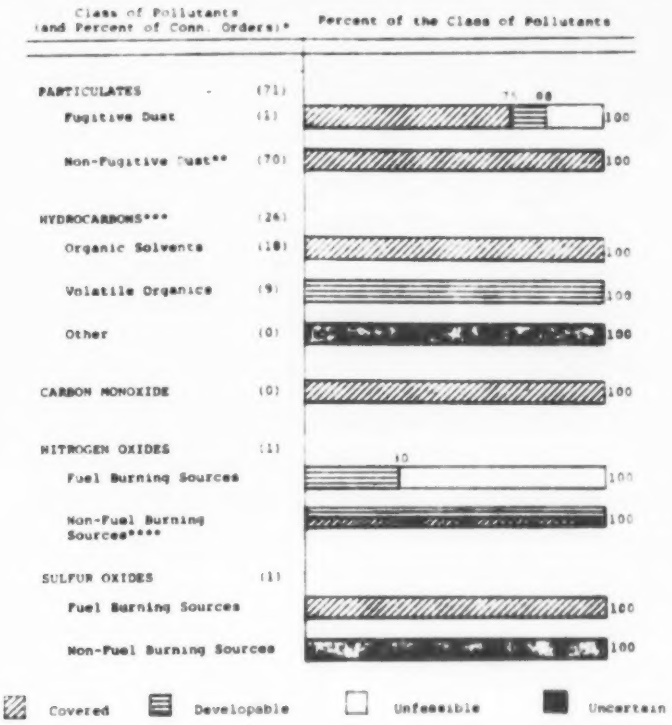
* See the brief listing of the chief data sources used that follows.

COST OF COMPLIANCE CURVES

The Department can use the cost curves that follow to find the cost of compliance for almost 90 percent of all cases issued orders. Moreover, many of the cases for which no curve is now available could be covered by curves developed in the future.

Percent of Pollutants Covered

By Cost of Compliance Graphs



Source: Random sample of Air Compliance Orders, Interviews with Air Staff.

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* Because odor and procedural violations are not covered by civil assessment regulations, orders for these violations are not included here. Order breakdowns are based on random sample of Air Compliance orders unless otherwise indicated.

** Includes visible emissions, particulate emissions from process sources.

*** Breakdown of hydrocarbons into subcategories is based on estimates of Air Compliance staff.

**** For this class of source, installed costs are covered, operational costs are only partially developed.

Since such curves would benefit any environmental agency, Federal or state, that decides to apply economic remedies, EPA should help with (1) the development of supplemental curves and (2) periodic updating of the curves that are available.

Data Sources

This manual draws upon costing data compiled from a large number of sources, both Connecticut and Federal. Data sources are identified throughout this manual by the following key:

Code	
DS-1	DEP tax relief records, DEP registration files, DEP computer databank "Perstat", interviews with individual companies
DS-2	Environmental Protection Agency AP-51: "Control Techniques for Particulate Air Pollutants". Note that this publication has been supplemented by RTI project 41U-762-13, "Update and Improvement of the Control Cost Segment of the Implementation Planning Program": CEP staff was not able to evaluate the theory and data contained in this newer volume.
DS-3	Environmental Protection Agency Manual AP-65: "Control Techniques for CO Emissions from Stationary Sources"
DS-4	Environmental Protection Agency Manual AP-68: "Control Techniques: Hydrocarbons and Organics"
DS-5	Blecker, H.G. & T.W. Cadman, "Capital and Operating Costs of Pollution Control Modules, Vol. I" EPA Manual R5-73-0232
DS-6	Federal Public Hearings of October 1973
DS-7	Connecticut Task Force on Coal Conversion
DS-8	Interviews with United Illuminating and Connecticut Natural Gas, 10/74
DS-9	*Basic Principles and Calculations in Chemical Engineering*, Himmelblau, Prentice-Hall

Data Adjustments

Because the data used comes from so many different sources, it was collected in different time periods and often uses different definitions. Consequently, a number of adjustments were necessary to make all data commeasurable:

(1) To correct for the cost impact of inflation, all costs were updated to July 1974 using the *Marshall and Swift* and the *Engineering News Record* economic indexes which are published in the magazine, *Chemical Engineering*. The method of updating follows the suggested corrections outlined in EPA's publication, *Capital and Operating costs of Pollution Control*, EPA-R5-73-023a, Volume I, pp. 74-77;

(2) **Where State costs included engineering costs, costs were decreased by a factor of 10%,(the average engineering cost in Connecticut) to make them commeasurable with the Federal data which excluded engineering costs**

(3) **Where costs were expressed as a function of process weight, these costs were transposed into costs per flow rate.**

Unless otherwise indicated, the use of the symbol DE in the rest of this chapter signifies that these adjustments were carried out.

Testing the Cost Curves

To test the accuracy of these curves, where possible, a "root mean square" analysis was performed on the data associated with each curve. The formula for this analysis is:

$$RMS = \left[\frac{1}{N} \sum_{i=1}^{N} \left(\frac{Ai - Ti}{Ti} \right)^2 \right]^{1/2}$$

Where

RMS = Root Mean Square of the data

N = Number of data points used for analysis

A = Cost of installing or operating a particular piece of equipment for a Connecticut company

T = The cost of installing or operating a piece of equipment predicted by the relevant cost curve

In most cases the result of this analysis has been included with the tabular data for each set of charts. In some cases, the data used was insufficient to test the quality of the curve. In these cases, the symbol "NA" appears in the accuracy column.

Updating and Extending Cost Curves

The cost curves that follow must be reviewed and updated from time to time. The technology of pollution abatement is developing rapidly, and costs reflect both these technological changes and the economy's fluctuations. Furthermore, the Department is developing a more complete base of Connecticut costing information that will allow the State to rely less on national data in the future.

A few cases may fall above or below the CFM volumes that define the upper and lower limits of the curves that are now available. Costs can still be estimated for most of these cases by further extrapolating these curves. Although it is more accurate to undertake such extrapolation mathematically, graphic extrapolation is quicker and can be tolerably accurate if careful attention is paid to inflection as well as to minima and maxima points.

Using the Cost Curves

In order to make the best use of the Department's cost curves, members of the Enforcement Section should take the following steps when confronted with a case that may require a civil assessment:

(1) Inspect the source premise and collect the following information:

- type of process
- hours of operation
- nature and weight of input
- nature and weight of output
- rate of input
- rate of output
- current control mechanisms
- other data likely to effect costing

(2) **Prepare a summary report including:**

- **the source's prior compliance record**
- **an analysis of the inspection data (including any calculations necessary to equate source data with the parameters of DEP's cost curves)**

(3) Choose a method of control which offers the greatest probability of attaining compliance without placing an unreasonable burden on the source.

> N.B. The choice of control equipment for costing purposes is for cost estimation only; it does not:
>
> a) guarantee that installation of this type of equipment will achieve compliance, or
>
> b) provide either approval or certification of the control system prior to final installation and testing.

(4) Read equipment and O&M costs from the appropriate curves.

(5) Adjust these cost estimates

- up 10 percent to account for engineering.* Accounting for structural modifications will be handled on a case-by-case basis.
- adjust the cost estimate for any variation in the average number of hours the control equipment is operated per year compared to the hours of operation assumed in and noted on each of the curves.**

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* These costs are uniformly excluded from all DEP cost curves to ensure uniform data definitions. Adding 10 percent to cover these costs is a conservative estimate suggested by a survey of Connecticut industry.

** EPA sources suggest that this linear adjustment can be made with little chance of serious distortion.

An example will help explain exactly what must be done in each of these steps. Assume a complaint has been received about particulate emissions from a Connecticut brass manufacturer. DEP staff would respond by taking the following steps:

(1) An engineer inspects the source and collects the following information:

The brass manufacturer is melting brass containing 15 percent zinc in an uncontrolled reverbatory type furnace at an average rate of 55 tons per 20-hour operational day (maximum rate is 72 tons per 20-hour day). The plant operates on a 5-day work week, 50 weeks a year. Currently installed hooding is sufficient to capture all emitted particulates with the fan operating at 22,000 actual feet per minute during maximum loading conditions.

(2) The engineer writes a summary report. It notes that this is a first time violation, and that, while there are numerous complaints from a nearby residential neighborhood about unsightly smoke, the environmental harm is currently small. The engineer calculates from the information collected in the inspection and from the known emission factor that the emission of 70 pounds of particulate per ton of material charged is in violation of Department standards. The actual calculation for a maximum standard emission level follows.

$$\therefore \text{PROCESS RATE} = 72\ \text{TONS/DAY}$$

$$= 72\ \frac{\text{TONS}}{\text{DAY}} \times \frac{\text{DAY}}{\text{20 HRS.}} \times \frac{\text{2000 POUNDS}}{\text{TON}} = 7200\ \text{POUNDS/HR.}$$

$$\Rightarrow \text{EMISSION RATE} =$$

$$72\ \frac{\text{TONS}}{\text{DAY}} \times \frac{\text{70 POUNDS}}{\text{TON}} \times \frac{\text{DAY}}{\text{20 HRS.}} = 252\ \text{POUNDS/HR.}$$

Under Department Regulation §19-508-18(e) the emission rate limitation for a process having a process weight rate of 7200 lbs./hr. is 7.8 lbs./hr. Therefore, this operation is in violation of Department Regulations §19-508-18(e).

(3) The engineer chooses a method of control to be used for costing. The engineer initially compares the magnitude of the process emission rate

(252 pounds per hour) to the Department regulation allowing 7.8 pounds per hour. This tells him that he needs a control strategy with 97 percent efficiency. This efficiency requirement, coupled with an industry preference to use a dry collection system wherever possible, leads the engineer to choose a baghouse as the control strategy he will assume in costing.

(4) He consults his cost curves for particulates/baghouses and reads the cost of compliance estimates he needs. Since the gas volume flow rate to be controlled is 22,000 ACFM, the cost figures from cost curves 1 and 13 (see pages V-76 and V-94) show the following costs:

EQUIPMENT COSTS = $54,000

OPERATING COSTS = $15,000 per year

(5) The inspector increases equipment costs to include engineering costs and adjusts the operating costs for hours. Increasing equipment costs by 10 percent makes the final EQUIPMENT COST = $54,000 + $5400 = $59,400.

Since the operating costs in curve 13 have a base of 8760 hours per year, and this process operates for only 5000 hours per year, operating costs must be reduced by a factor of (5000/8760),yielding a final OPERATING COST of $8561 per year.

COST CURVES

FOR INSTALLED EQUIPMENT COSTS

Unless otherwise noted, "installed equipment costs" include the following components:

- control hardware, e.g., a scrubber
- auxiliary equipment, e.g., fans and ductwork
- engineering and design work
- installation costs, e.g., rigging

Annotated cost curves for installed equipment costs covering the most common pollutants and types of control equipment can be found on the following pages:

Cost Curve Figure No.	Title	Page
1	Installed Costs of Particulate Control Equipment - Comparative Composite	V-74
2	Installed Cost of High Voltage Electrostatic Precipitators - Particulate Control	V-75
3	Installed Cost of Baghouses - Particulate Control	V-76
4	Installed Cost of Wet Collectors - Particulate Control	V-77
5	Installed Costs of Hydrocarbon Control Equipment - Comparative Composite	V-79
6	Installed Cost of Activated Carbon Adsorbers - Hydrocarbon Control	V-80
7	Installed Cost of Direct Flame Afterburners - Hydrocarbon Control	V-81
8	Installed Cost of Afterburners - Carbon Monoxide (CO) Control	V-83
9	Installed Cost of Wet Collectors - Nitrogen Oxide (NOx) Control	V-85
10	Installed Cost of Limestone Wet Collectors - Sulfur Oxide (SOx) Control of Power Plants	V-87

Cost Curve Figure No.	Title	Page
11	Annual Operating and Maintenance Costs of Particulate Control Equipment - Comparative Composite	V-90
12	Annual Operating and Maintenance Costs of High Voltage Electrostatic Precipitators - Particulate Control	V-91
13	Annual Operating and Maintenance Costs of Baghouses - Particulate Control	V-92
14	Annual Operating and Maintenance Costs of Wet Collectors - Particulate Control	V-93
15	Annual Operating and Maintenance Costs of Hydrocarbon Control Equipment - Comparative Composite	V-95
16	Annual Operating and Maintenance Costs of Activated Carbon Adsorbers - Hydrocarbon Control	V-96
17	Annual Operating and Maintenance Costs of Afterburners - Hydrocarbon Control	V-97
18	Annual Operating and Maintenance Costs of Afterburners - Carbon Monoxide (CO) Control	V-99
19	Annual Operating and Maintenance Costs of Wet Scrubbers - Nitrogen Oxide (NOx) Control	V-101
20	Annual Operating and Maintenance Costs of Limestone Wet Scrubbers - Sulfur Oxide (SOx) Control of Power Plants	V-103

THE COST OF INSTALLED EQUIPMENT - PARTICULATES

Each set of cost curves developed for a type of pollutant is introduced by a table listing the sources of the data used, what adjustments have been made in developing each curve, the closeness of the fit between the curve and actual Connecticut case experience, and other comments important to a full understanding of the curves.

The first set of curves deals with particulate control problems. They account for over 70 percent of all orders.

COST CURVE DATA, ADJUSTMENT, AND INTERPRETATION:

COSTING INSTALLED EQUIPMENT FOR

PARTICULATE CONTROL

Cost Curve Figure No.	Equipment	Major Data Source (s)	Adjustments	Fit With Conn. Cases	Comments
1	Precipitator Baghouse Scrubber	DS-1, 2	DE*	N.A.	These curves show the relationships between costs and thousands of actual cubic feet per minute of gas to be controlled.
2	Precipitator	DS-1, 2	DE	± 70.6%	These costs represent an average between high and medium efficiency bands shown in EPA data.
3	Baghouse	DS-1, 2	DE The EPA curve was extrapolated downward to 200 acfm by making a "least squares" fit of the actual Conn. costing data below the range of EPA data	± 64.9%	These costs represent the costs of average high and medium temperature ranges depicted by EPA data.
4	Wet Collector (Scrubber)	DS-1, 2	DE	± 21.6%	These costs represent an average between high and medium efficiency ranges shown in EPA data.

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* The term "DE" indicates what adjustments were made on the data for these curves. For an explanation of these adjustments, see page V-67.

K+E LOGARITHMIC 2 X 3 CYCLES 46 7320 MADE IN U.S.A.

INSTALLED COSTS OF PARTICULATE CONTROL EQUIPMENT
-COMPARATIVE COMPOSITE-

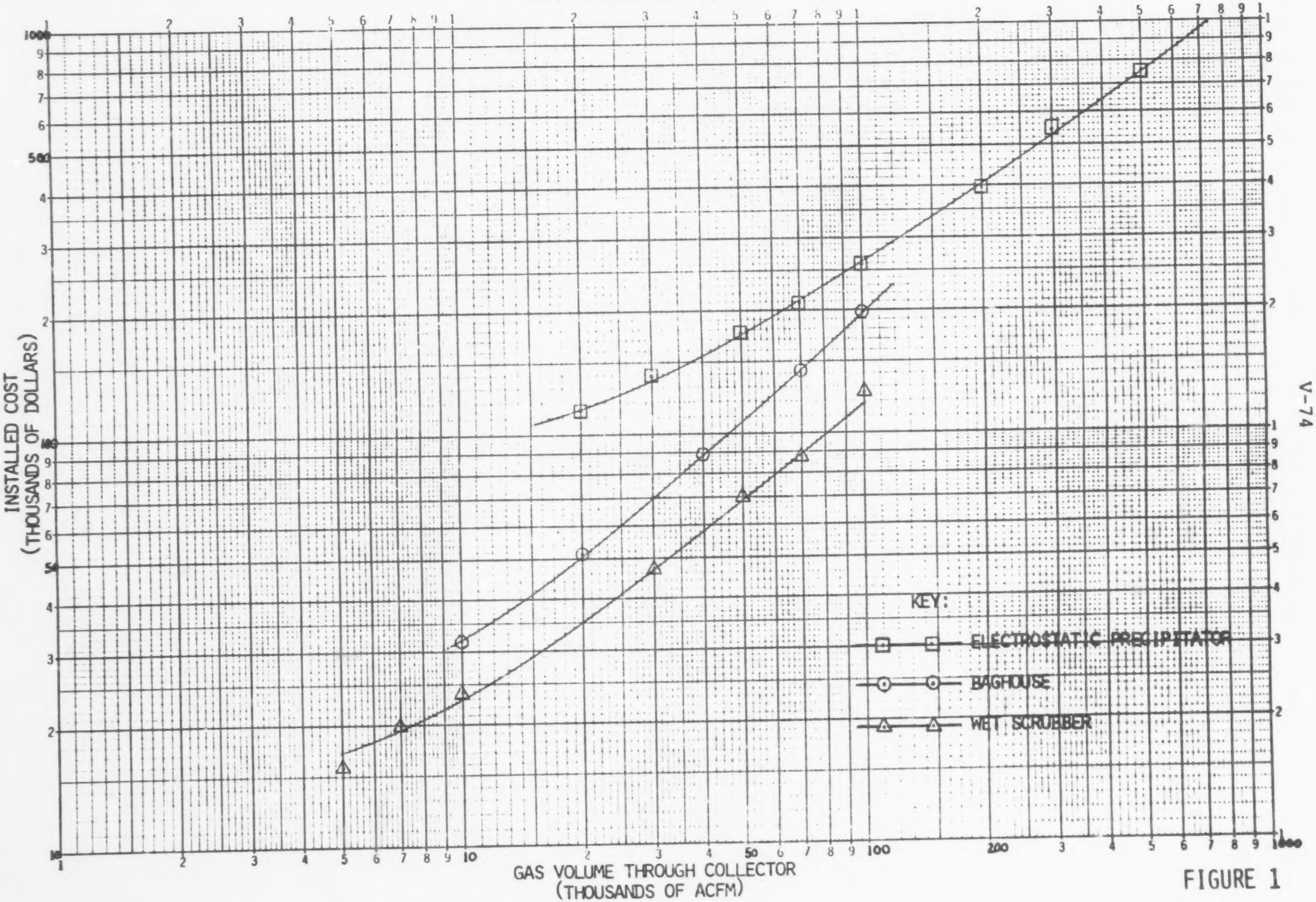


FIGURE 1

INSTALLED COST OF HIGH VOLTAGE ELECTROSTATIC PRECIPITATORS
-PARTICULATE CONTROL-

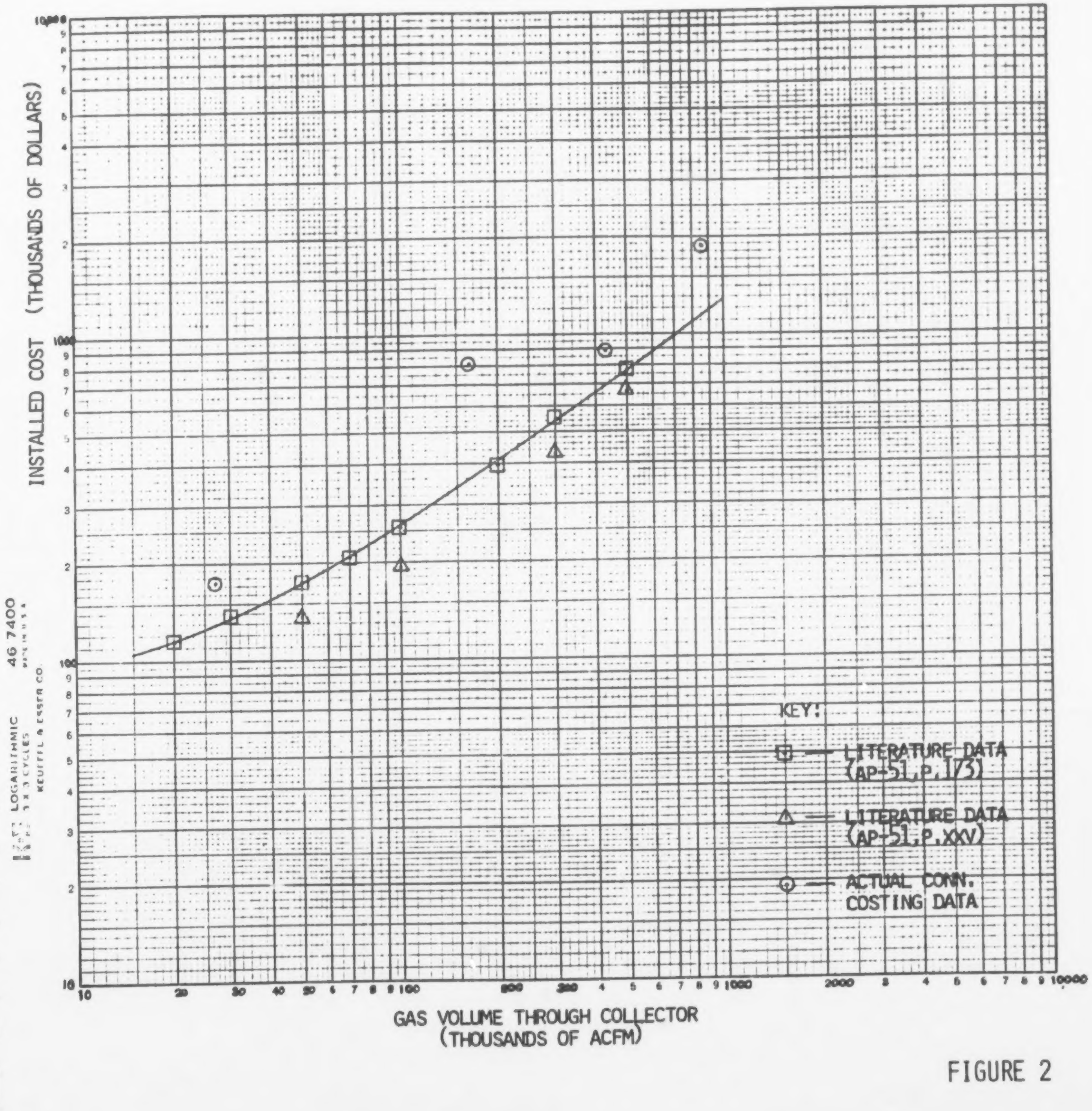


FIGURE 2

INSTALLED COST OF BAGHOUSES
-PARTICULATE CONTROL-

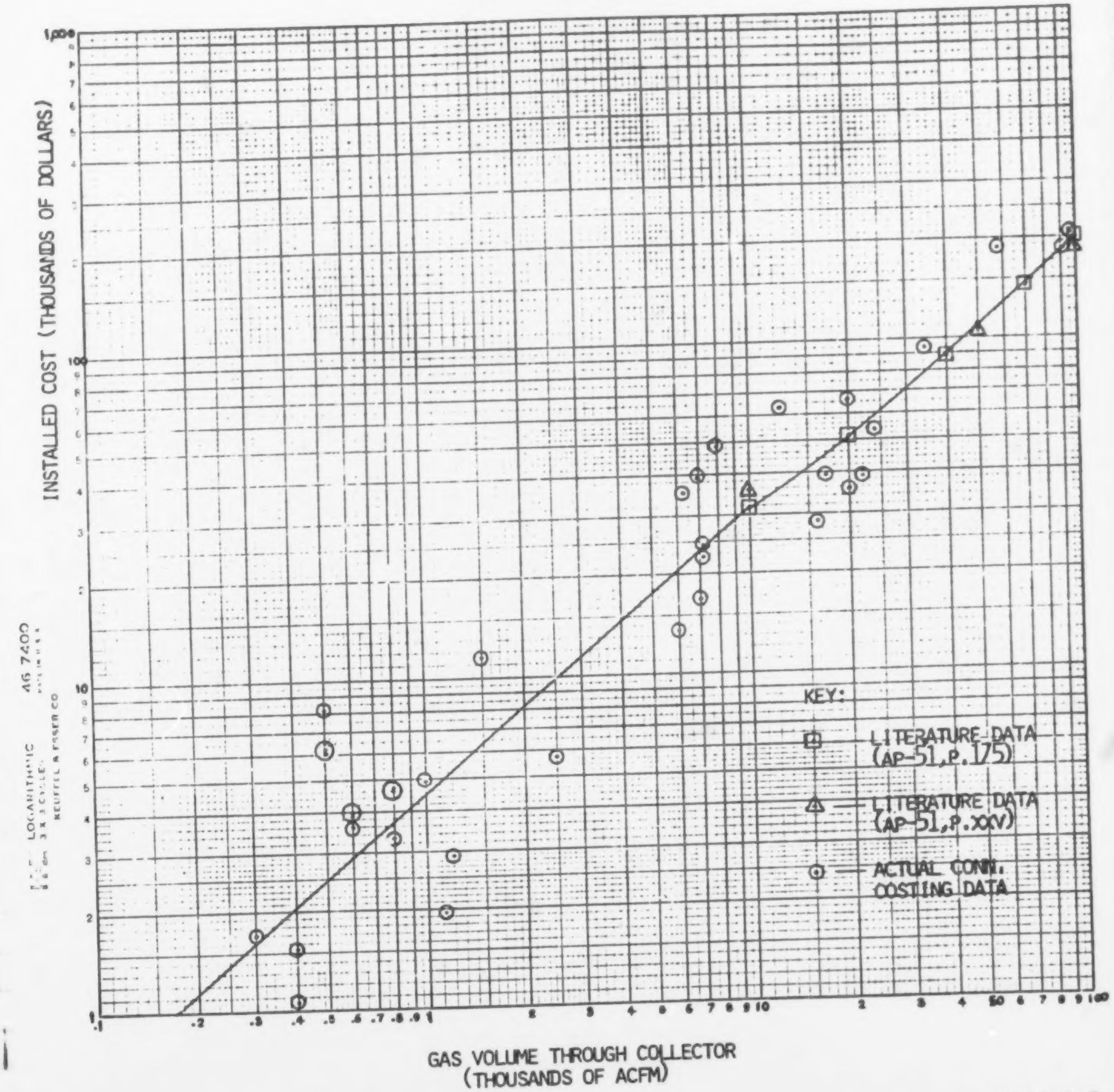


FIGURE 3

INSTALLED COST OF WET COLLECTORS

-PARTICULATE CONTROL-

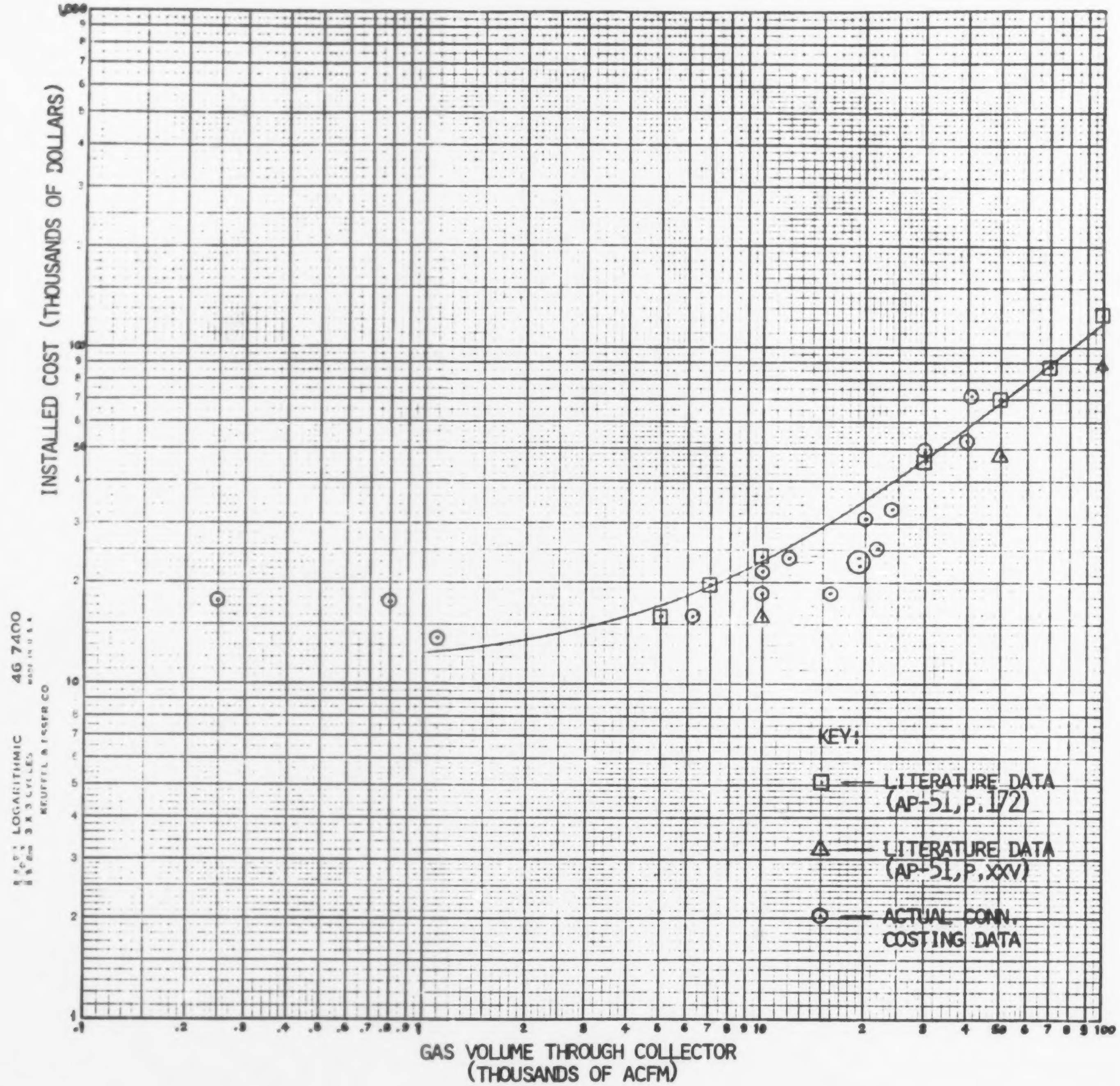


FIGURE 4

THE COST OF INSTALLED EQUIPMENT - HYDROCARBONS

There are two kinds of equipment commonly used to control hydrocarbon emissions: activated carbon adsorbers and fume incinerators (afterburners). The following table summarizes the important information concerning the hydrocarbon emission control cost data contained in cost curves 5-7.

COST CURVE DATA, ADJUSTMENT, AND INTERPRETATION:

COSTING INSTALLED EQUIPMENT FOR

HYDROCARBON EMISSION CONTROL

Cost Curve Figure No.	Equipment	Major Data Source(s)	Adjustments	Fit With Conn. Cases	Comments
5	Adsorber Afterburner	DS-1, 2, 4	DE	NA	Curve compares costs per 1000's of actual cubic feet per minute of gas to be controlled.
6	Activated Carbon Adsorbers	DS-1, 2, 4	DE	± 30.5%	EPA data is based on 1969 pilot project plant, and the validity of scaled-up estimates is questionable. The cost curve is therefore drawn through actual Conn. data points costs only.
7	Fume Incinerators (Direct Flame Afterburners)	DS-1, 2, 4	DE Data here multiplied by factor of 1.5 to transform EPA purchase costs to installed costs. Correction factor supplied by EPA.	± 20.3%	Theoretical costs represent average of EPA ranges. For catalytic afterburners, increase costs by 15%.

INSTALLED COSTS OF HYDROCARBON CONTROL EQUIPMENT
-COMPARATIVE COMPOSITE-

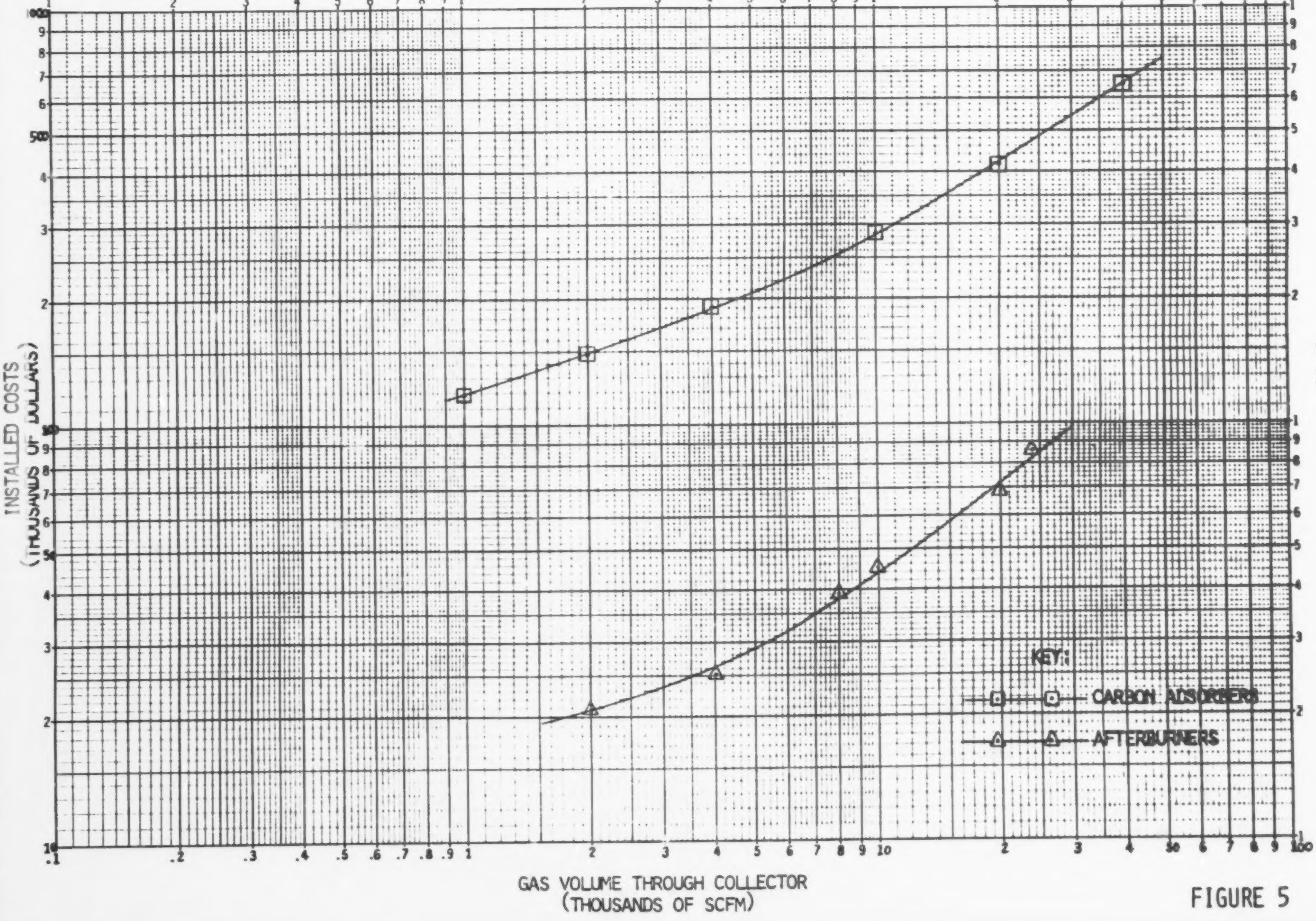


FIGURE 5

INSTALLED COSTS OF ACTIVATED CARBON ADSORBERS
-HYDROCARBON CONTROL-

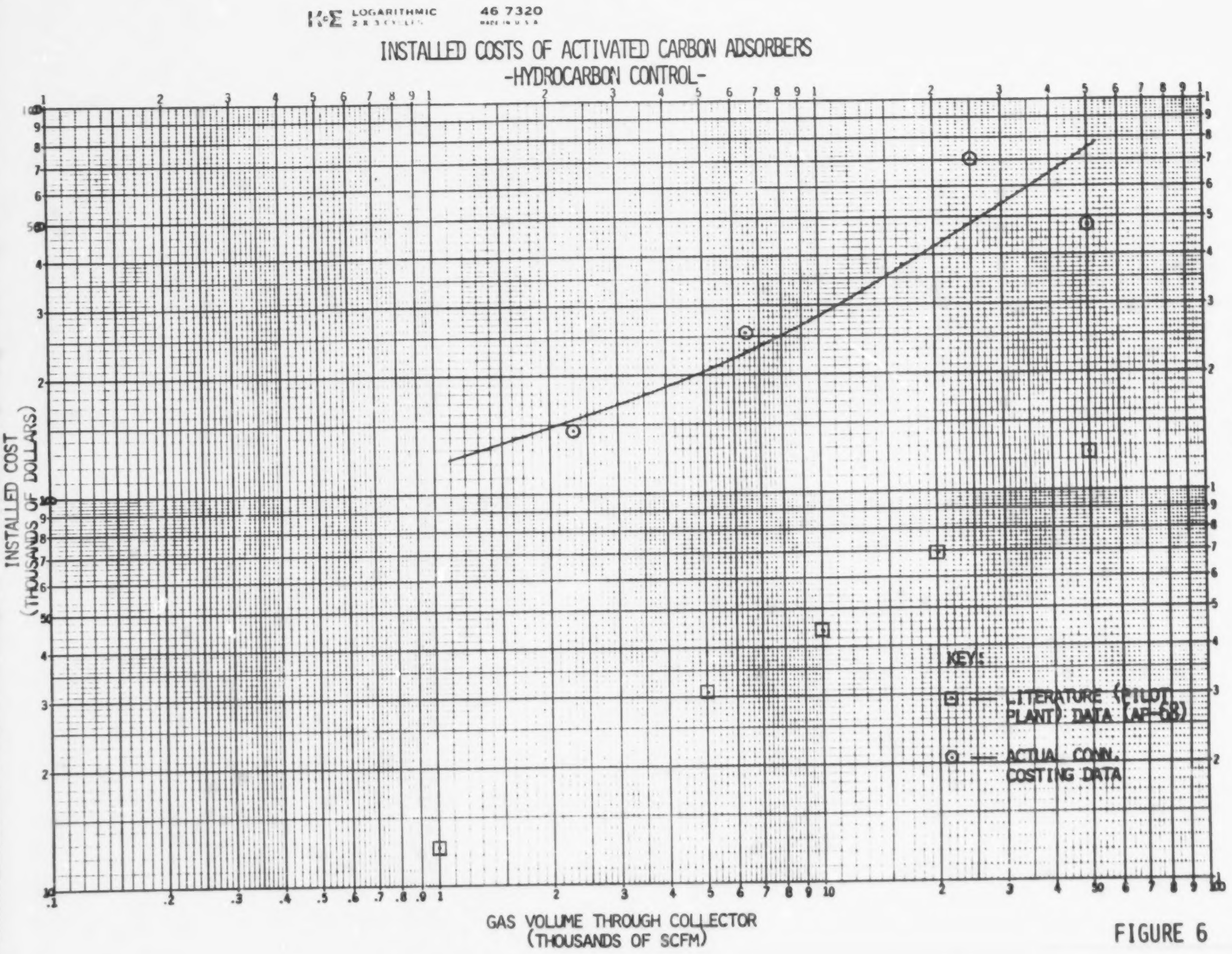


FIGURE 6

K&E LOGARITHMIC 2 X 3 CYCLES KEUFFEL & ESSER CO 46 7320 MADE IN U.S.A.

INSTALLED COSTS OF DIRECT FLAME AFTERBURNERS
-HYDROCARBON CONTROL-

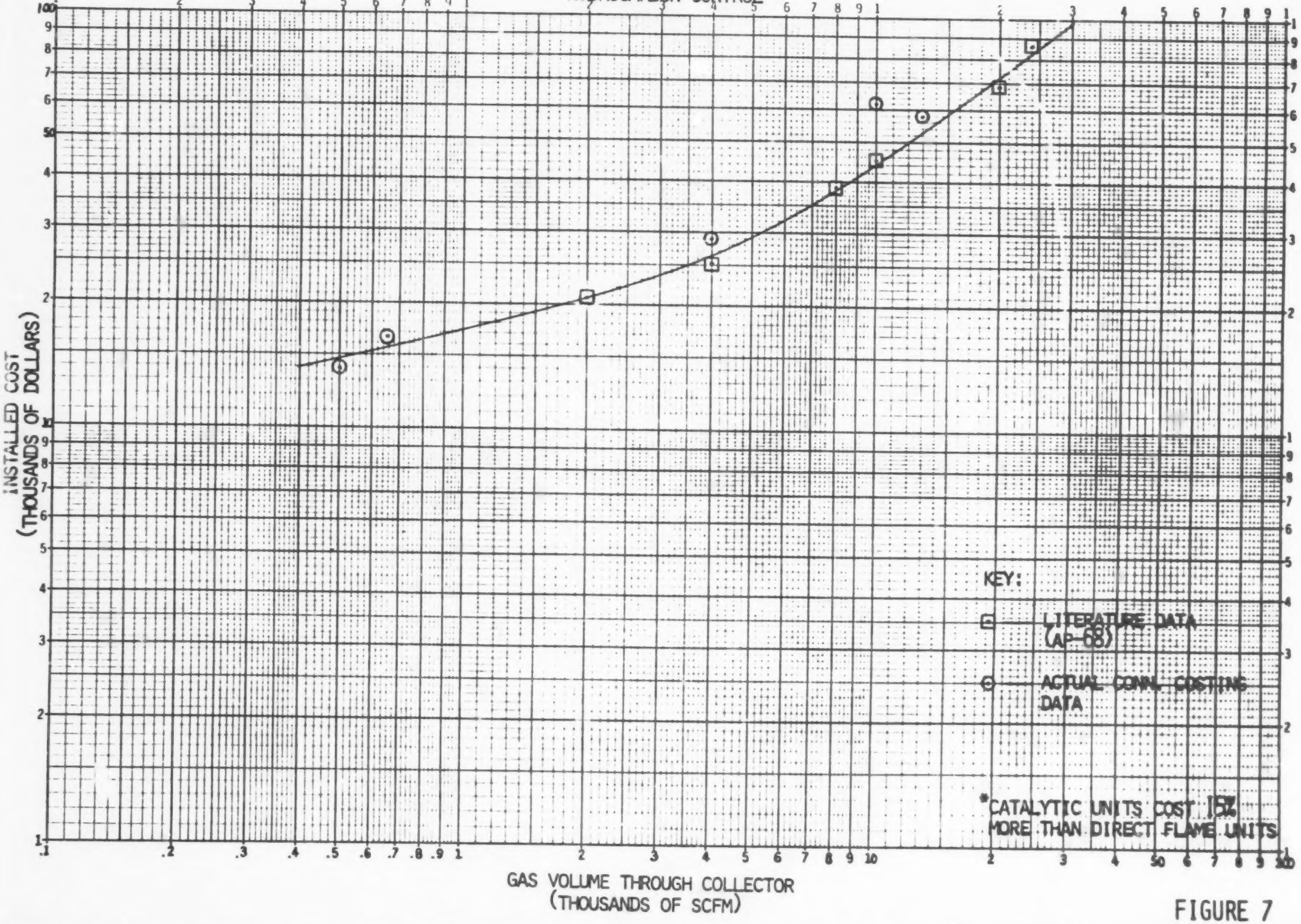


FIGURE 7

THE COST OF INSTALLED EQUIPMENT - CARBON MONOXIDE

Fuel burning is the major source of carbon monoxide emissions in Connecticut. Department estimates indicate that 98 percent* of all carbon monoxide in the State comes from this source. However, the control of fuel burning emissions is more a problem of optimum combustion parameters (fuel rate, excess air, retention time, mixing, etc.) than it is a problem of needed control equipment. Accordingly, this costing manual focuses on equipment costs for non fuel-burning sources of carbon monoxide.

The Department of Environmental Protection has located only one major industrial source of carbon monoxide in the State: grey iron cupolas. Since the only presently available method of CO control is fume incineration, the cost curve for CO emission control presents costs for both direct flame and catalytic afterburners.

COST CURVE DATA, ADJUSTMENT, AND INTERPRETATION:

COSTING INSTALLED EQUIPMENT FOR

CARBON MONOXIDE CONTROL

Cost Curve Figure No.	Equipment	Major Data Source (s)	Adjustments	Fit With Conn. Cases	Comments
8	Direct Flame and Catalytic Afterburners	DS-1, 2, 3 *	DE	N.A.	

---

* Includes motor vehicle emissions.

INSTALLED COST OF AFTERBURNERS
-CARBON MONOXIDE (CO) CONTROL-

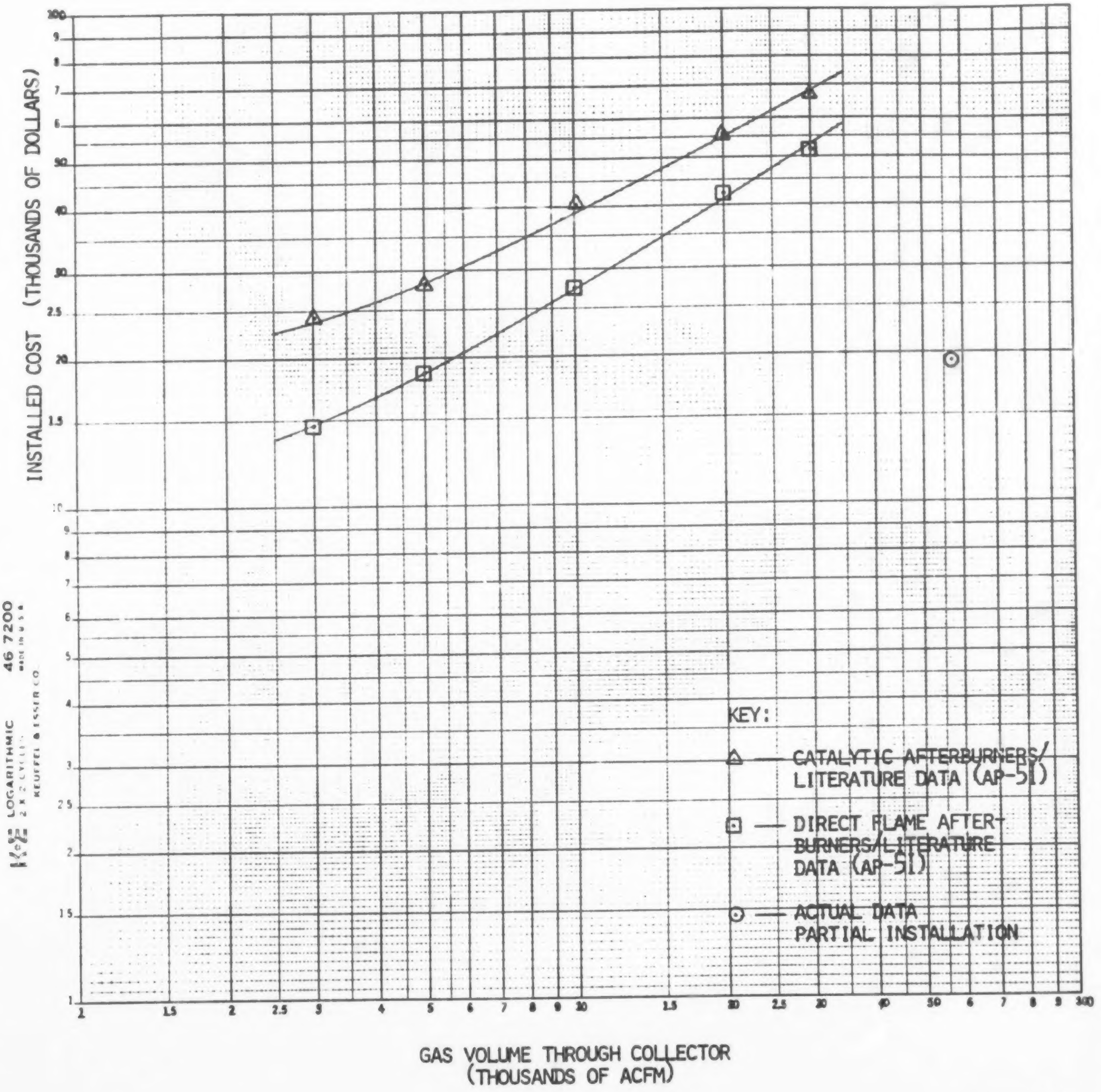


FIGURE 8

THE COST OF INSTALLED EQUIPMENT - NITROGEN OXIDES

Unfortunately, no useful EPA data on the cost of nitrogen oxide control was available, and Connecticut sources have had little experience with installing equipment for nitrogen oxide control. A curve utilizing the three Connecticut data points found will be used until more data becomes available.

COST CURVE DATA, ADJUSTMENT, AND INTERPRETATION:

COSTING INSTALLED EQUIPMENT FOR

NITROGEN OXIDE CONTROL

Graph	Equipment	Major Data Source(s)	Adjustments	Accuracy	Comments
9	Wet Scrubber	DS-1	DE	N.A.	

LOGARITHMIC 46 7320
2 X 3 CYCLES MADE IN U.S.A.
KEUFFEL & ESSER CO

INSTALLED COST OF WET SCRUBBERS
-NITROGEN OXIDE (NOx) CONTROL-

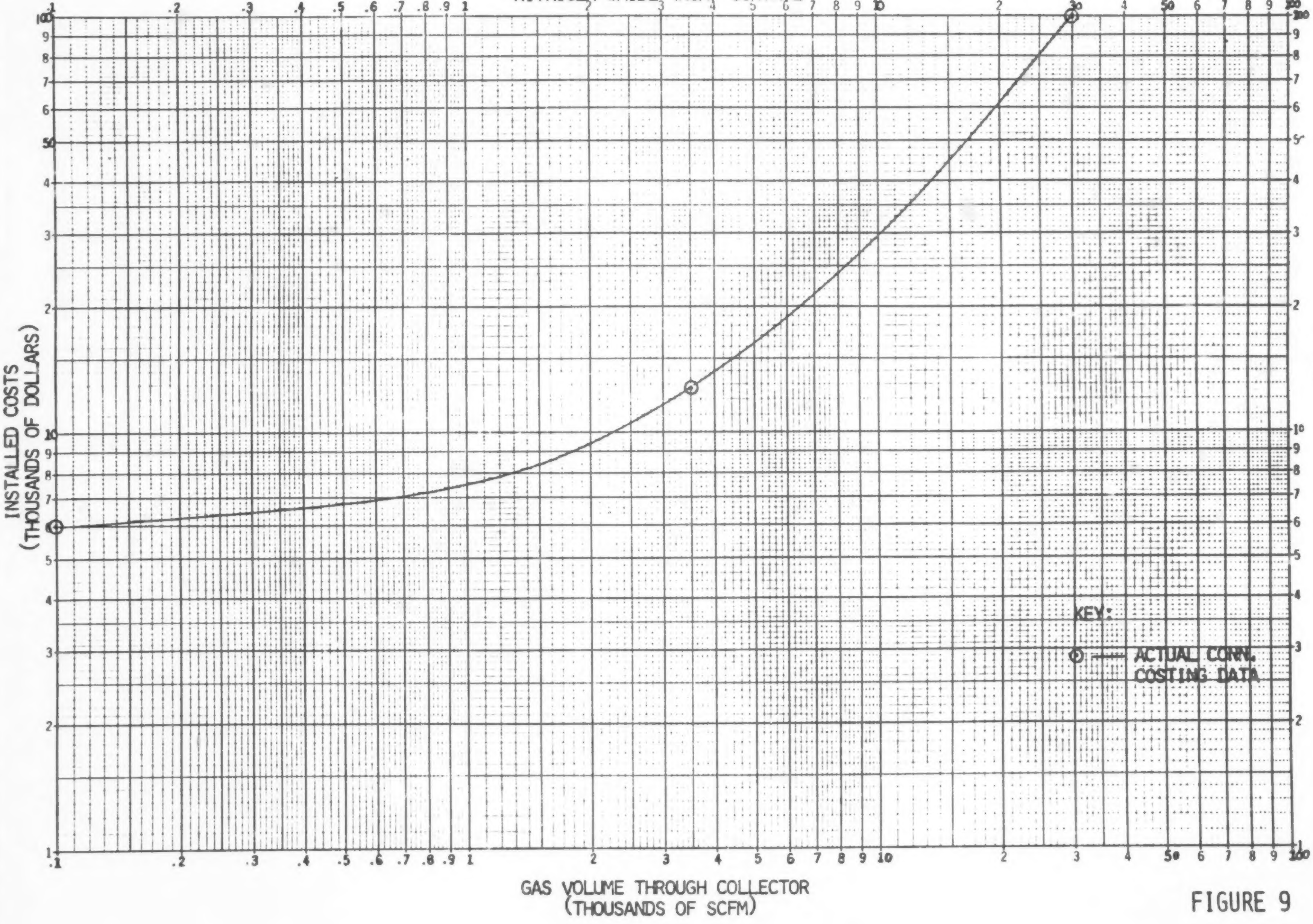


FIGURE 9

THE COST OF INSTALLED EQUIPMENT - SULFUR DIOXIDES

The only available data for costing control equipment for sulfur dioxide emissions is for limestone wet scrubbers. This control technique is usually appropriate for large power utilities.

COST CURVE DATA, ADJUSTMENT, AND INTERPRETATION:

COSTING INSTALLED EQUIPMENT FOR
SULFUR DIOXIDE CONTROL

Graph	Equipment	Major Data Source(s)	Adjustments	Fit With Conn. Cases	Comments
10	Limestone wet scrubber	DS-11 DS-12	DF The curve is a "least squares" fit of all available data.	NA	The curve shows a relationship between power plant capacity in megawatts and installed capital costs in terms of dollars per kilowatt capacity. Since the curve is based on all data available, a comparison between Connecticut data and projected costs is not applicable.

INSTALLED COSTS OF LIMESTONE WET SCRUBBERS
-SULFUR OXIDE (SOx) CONTROL ON POWER PLANTS-

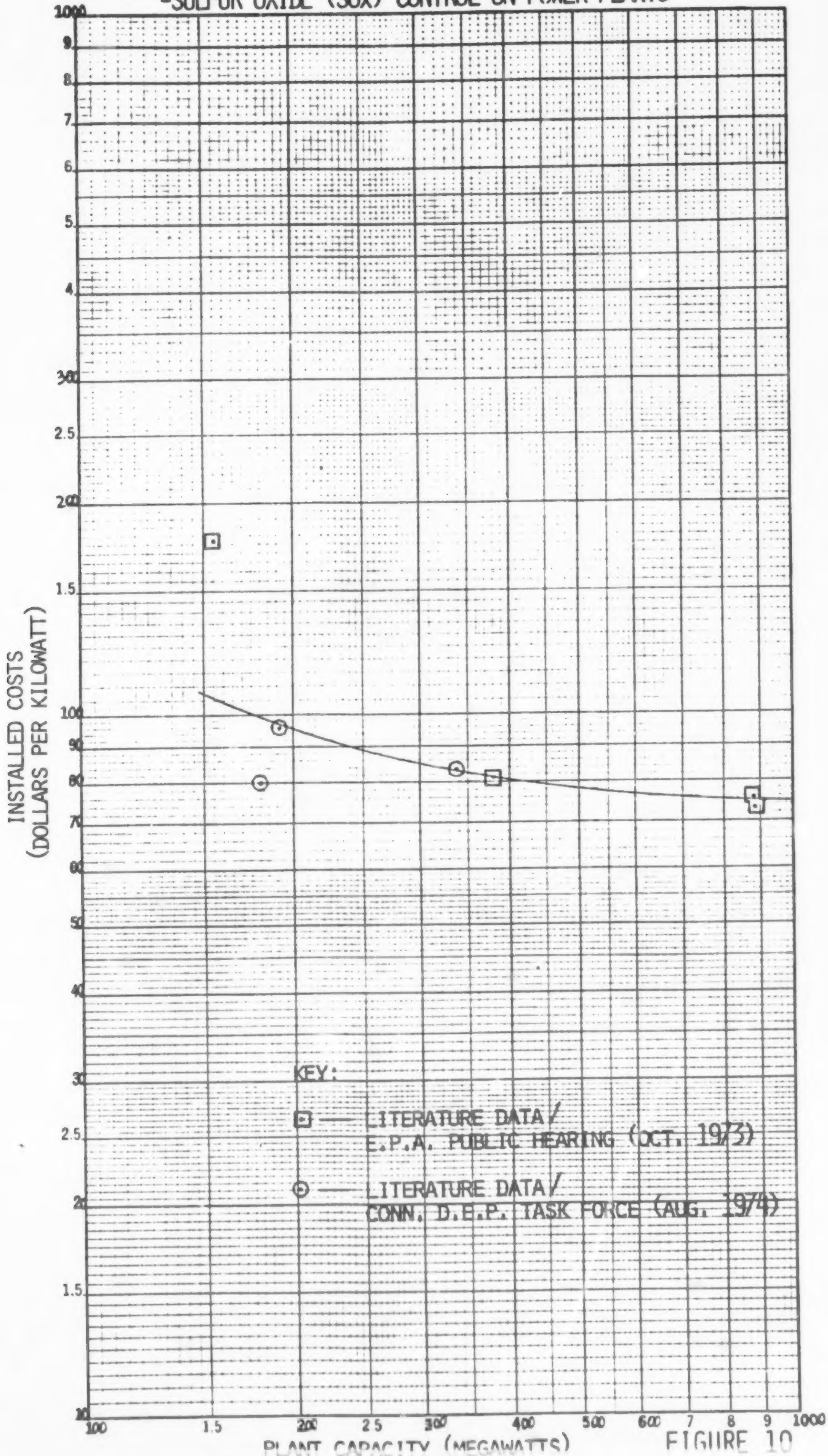


FIGURE 10

K+E LOGARITHMIC 46 7080
2 X 1 CYCLES MADE IN U.S.A.
KEUFFEL & ESSER CO.

COST CURVES

FOR OPERATING AND MAINTENANCE

Operating and maintenance expenses are cumulatively a major component of control costs. Labor, routine operating supplies, replacement parts, and energy can all be major expenses.

As with installed equipment costs, the following curves are based on an extensive review of the available costing literature and on Connecticut case experience. However, the data is significantly less reliable than that used to derive the equipment cost curves. Few sources keep detailed account of the cost of operating and maintaining discreet pieces of control apparatus.

As with the installed equipment cost curves, the Department has had to make a series of adjustments to the disparate cost data used to construct its O&M curves to ensure that the bits of information being used were comparable. All costs:

* were adjusted to either 8760 or 6000 hours of operation per year as indicated

* were updated to reflect the current costs of electrical power

* were adjusted to July 1974 for inflation

* were translated into a function of flow rates.

Annotated O&M cost curves for operating and maintenance expenses can be found on the following pages.

THE COST OF OPERATING AND MAINTAINING EQUIPMENT

PARTICULATE CONTROL

The following graphs detail operating and maintenance costs for three methods of particulate control - wet scrubbers, baghouses, and electrostatic precipitators.

COST CURVE DATA, ADJUSTMENT, AND INTERPRETATION:

OPERATING AND MAINTAINING EQUIPMENT

PARTICULATE CONTROL

Graph	Equipment	Major Data Source(s)	Adjustments	Fit With Conn. Cases	Comments
11	Wet Scrubbers Baghouses Electrostatic Precipitators	DS-1, 2, 5, 8	DE	N.A.	Compares costs of O&M in thousands of annual dollars per unit of gas controlled
12	Electrostatic Precipitator	DS-1, 2, 5, 8	DE	± 33.2%	
13	Baghouses	DS-1, 2, 5, 8	DE	± 59.7%	
14	Wet Scrubbers	DS-1, 2, 5, 8	DE	± 44.3%	

ANNUAL OPERATING & MAINTENANCE COSTS OF PARTICULATE CONTROL EQUIPMENT *

-COMPARATIVE COMPOSITE-

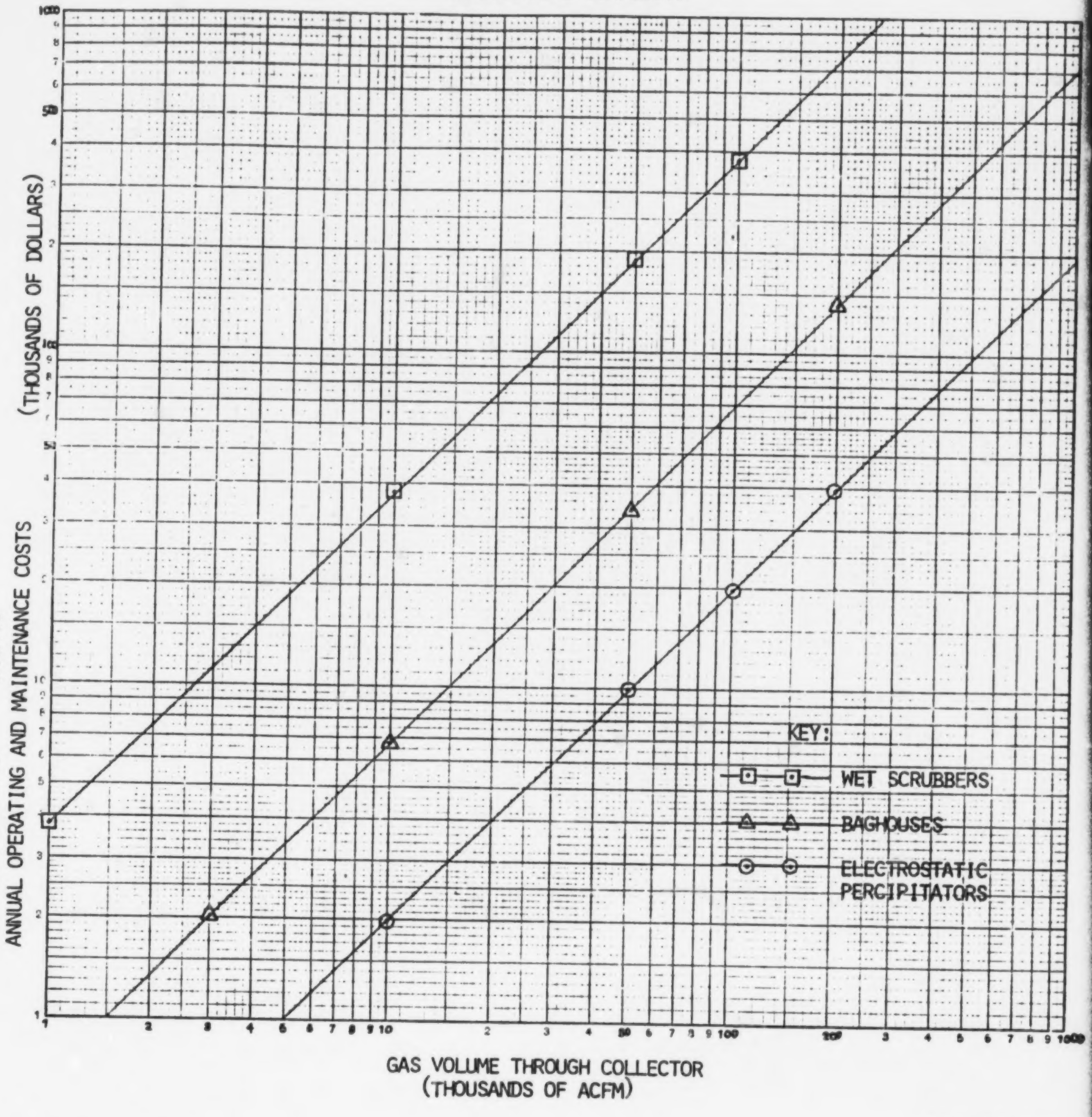


FIGURE 11

*BASIS: 8760 OPER.HRS/YR

ANNUAL OPERATING AND MAINTENANCE COST OF HIGH VOLTAGE ELECTROSTATIC PRECIPITATOR*

-PARTICULATE CONTROL-

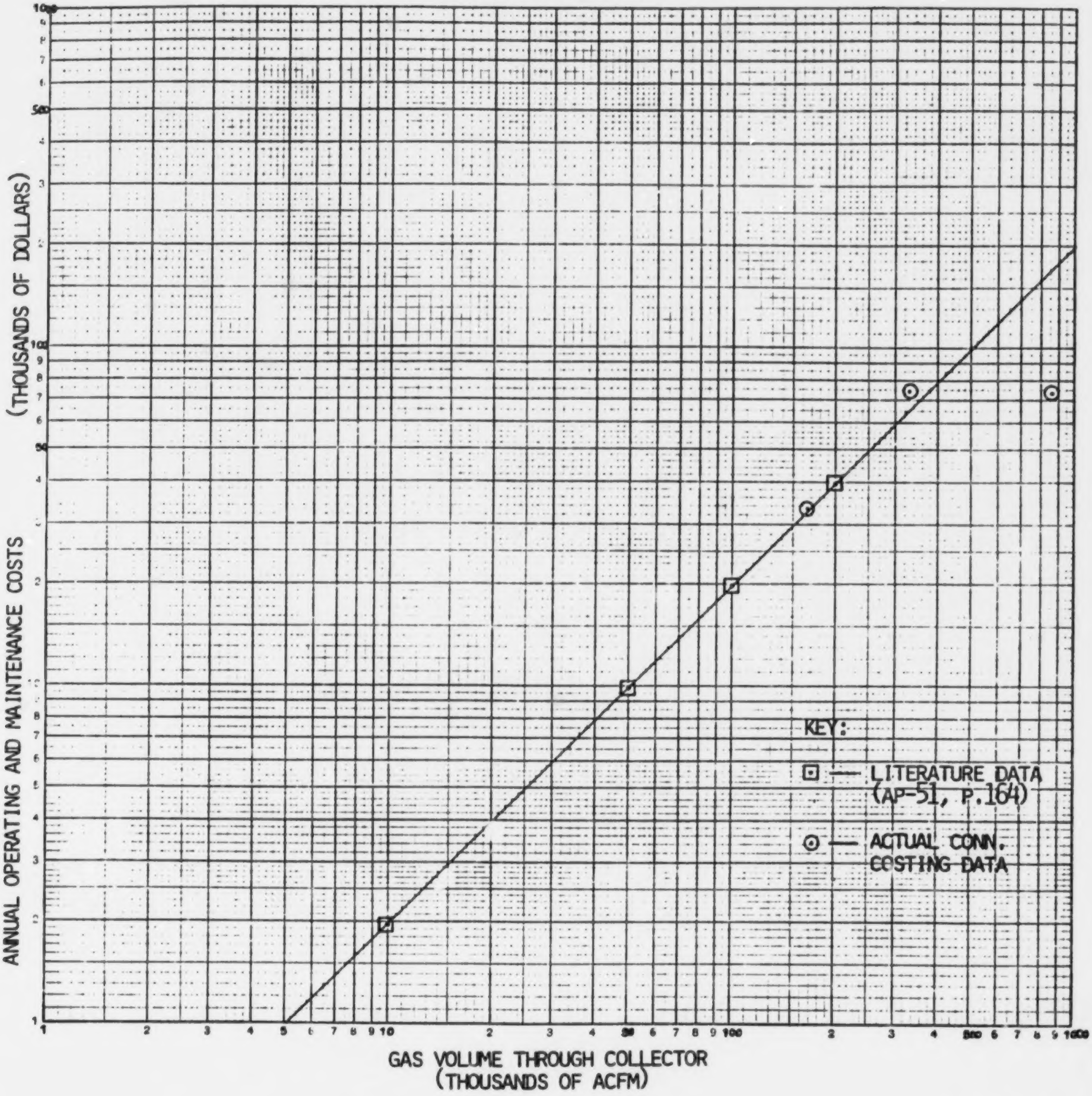


FIGURE 12

*BASIS: 8760 OPER.HRS/YR

ANNUAL OPERATING & MAINTENANCE COST OF BAGHOUSES*

-PARTICULATE CONTROL-

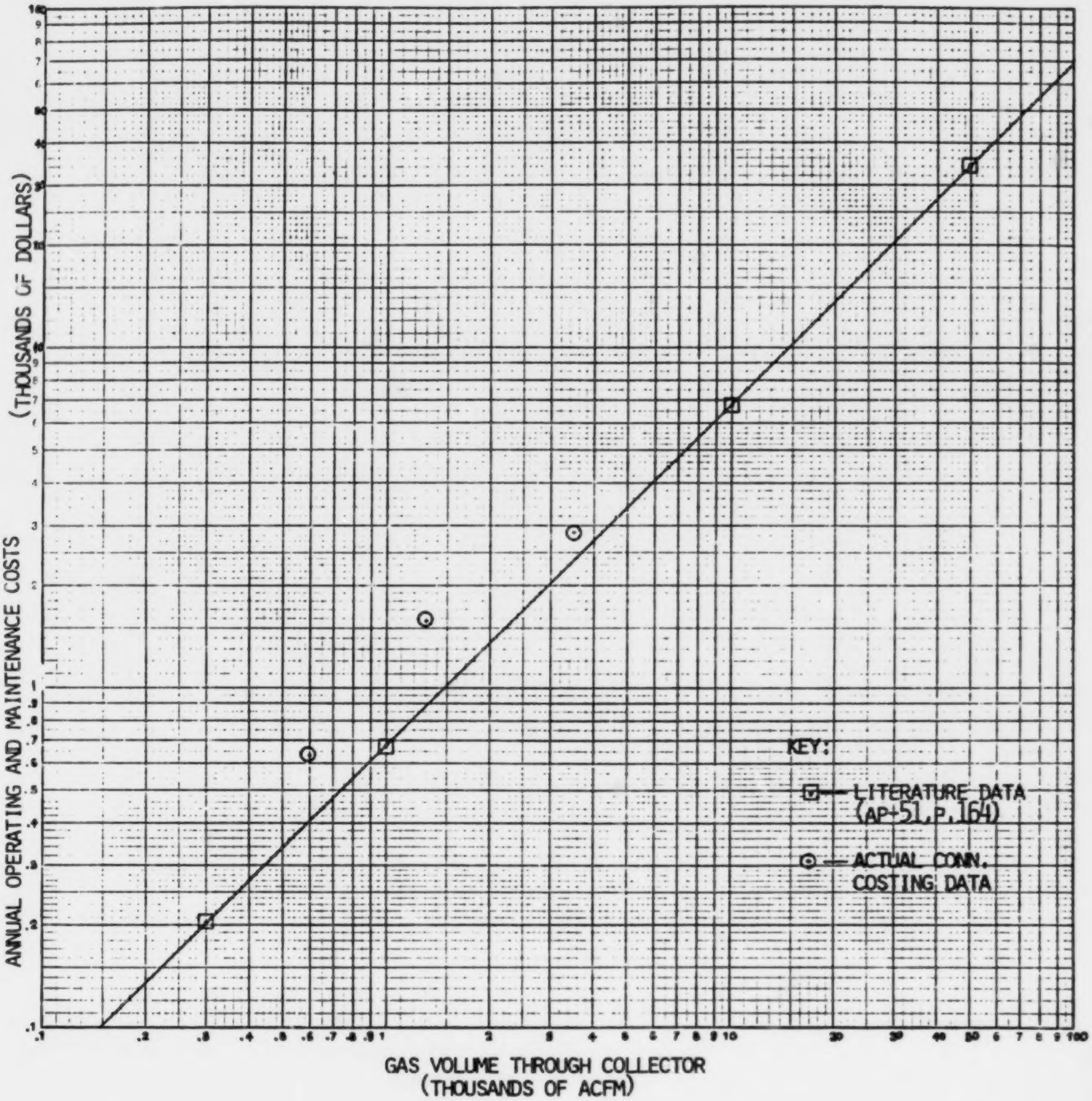


FIGURE 13

*BASIS: 8760 OPER.HRS/YR

ANNUAL OPERATING & MAINTENANCE COST OF WET COLLECTORS *

-PARTICULATE CONTROL-

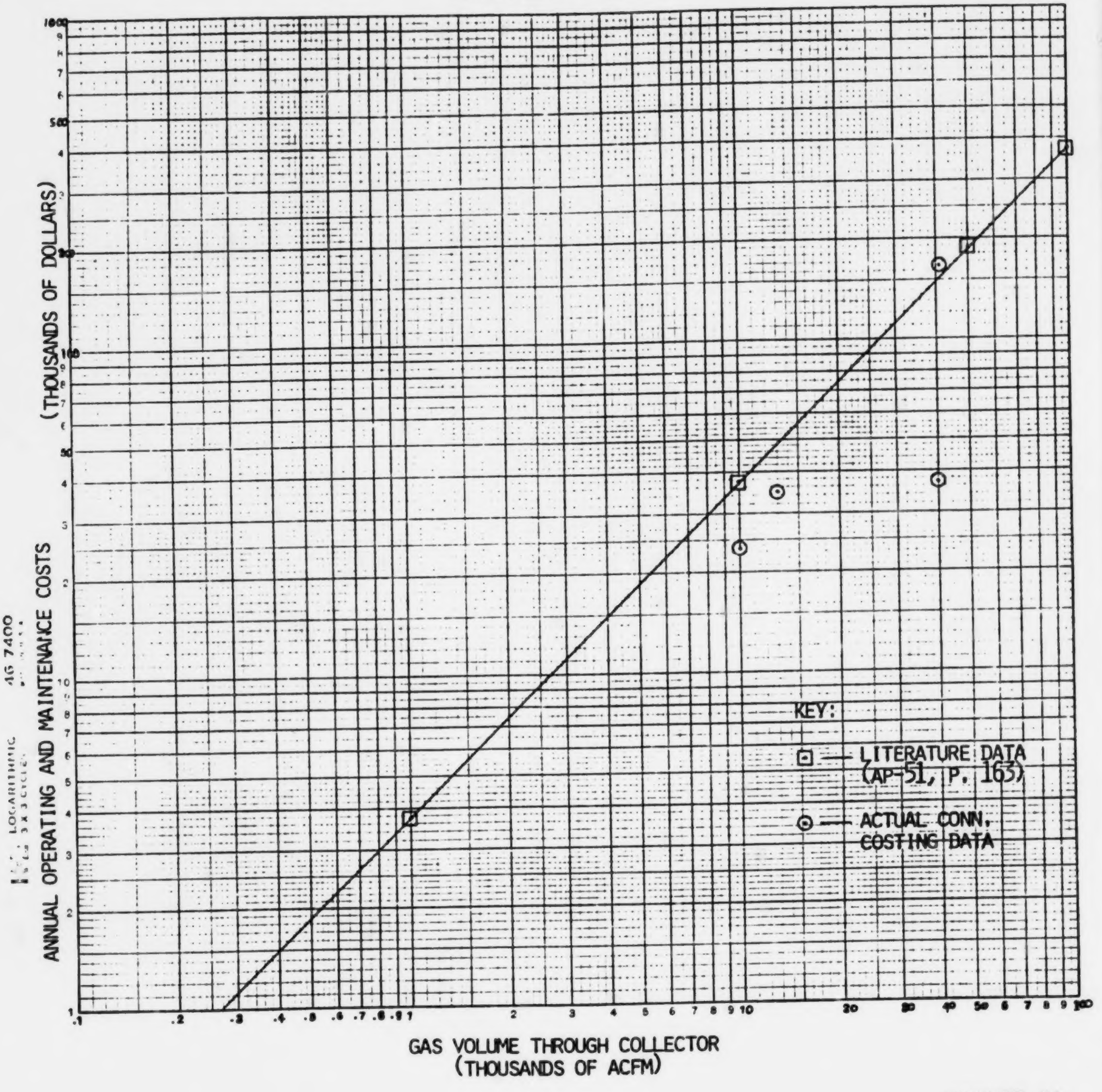


FIGURE 14

*BASIS: 8760 OPER.HRS/YR

THE COST OF OPERATING AND MAINTAINING EQUIPMENT

HYDROCARBONS

The following table summarizes information concerning the charts for operating and maintaining equipment commonly used for hydrocarbon control.

COST CURVE DATA, ADJUSTMENTS, AND INTERPRETATION:

OPERATING AND MAINTAINING EQUIPMENT

HYDROCARBON CONTROL

Graph	Equipment	Major Data Source(s)	Adjustments	Fit With Conn. Cases	Comments
15	Activated Carbon Adsorbers Fume Incinerators (Afterburners)	DS-1			Curve compares costs of O&M in thousands of dollars per unit of gas controlled
16	Activated Carbon	DS-1		± 17.1%	
17	Fume Incinerators (Afterburners)	DS-1,9		N.A.	The curve assumes 1. fuel costs exceed maintenance costs 2. fuel costs are proportional to CFM and gas volume 3. natural gas is used for afterburning 4. natural gas cost = \$2.40/1000 ft. 5. pollutant added no heat value 6. no heat recovery employed 7. operating year is 2000 nrs. - Curves are shown for different inlet temperatures. - No catalytic data is currently available Since the gas inlet temperature of Conn. data points was not available, it is not possible to test the accuracy of these curves with the points available. The data points are included to demonstrate that, in general, as the amount of gas to be controlled rises, so does the cost of operating and maintaining that equipment.

ANNUAL OPERATING & MAINTENANCE COSTS OF HYDROCARBON CONTROL EQUIPMENT *

-COMPARATIVE COMPOSITE-

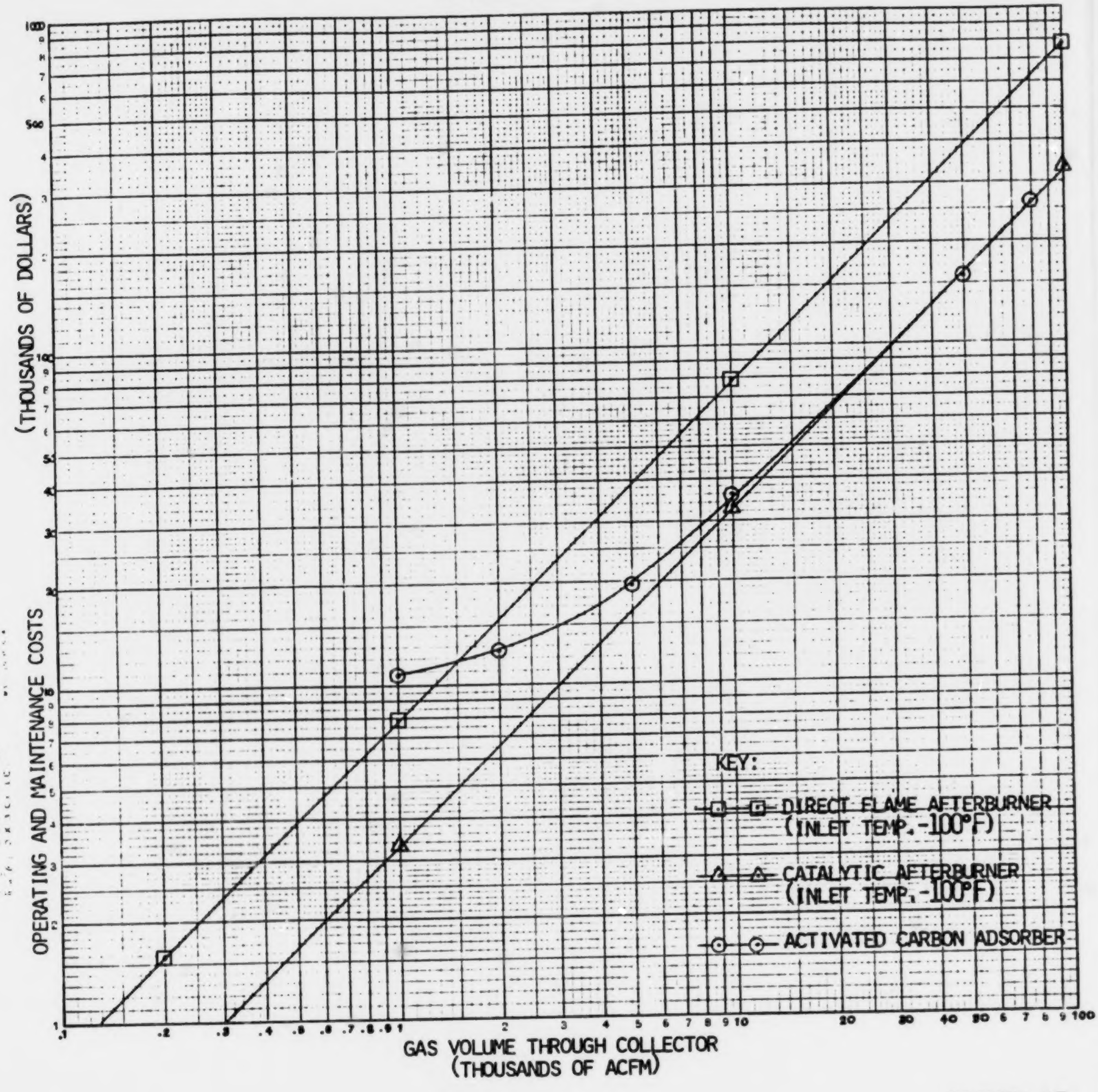
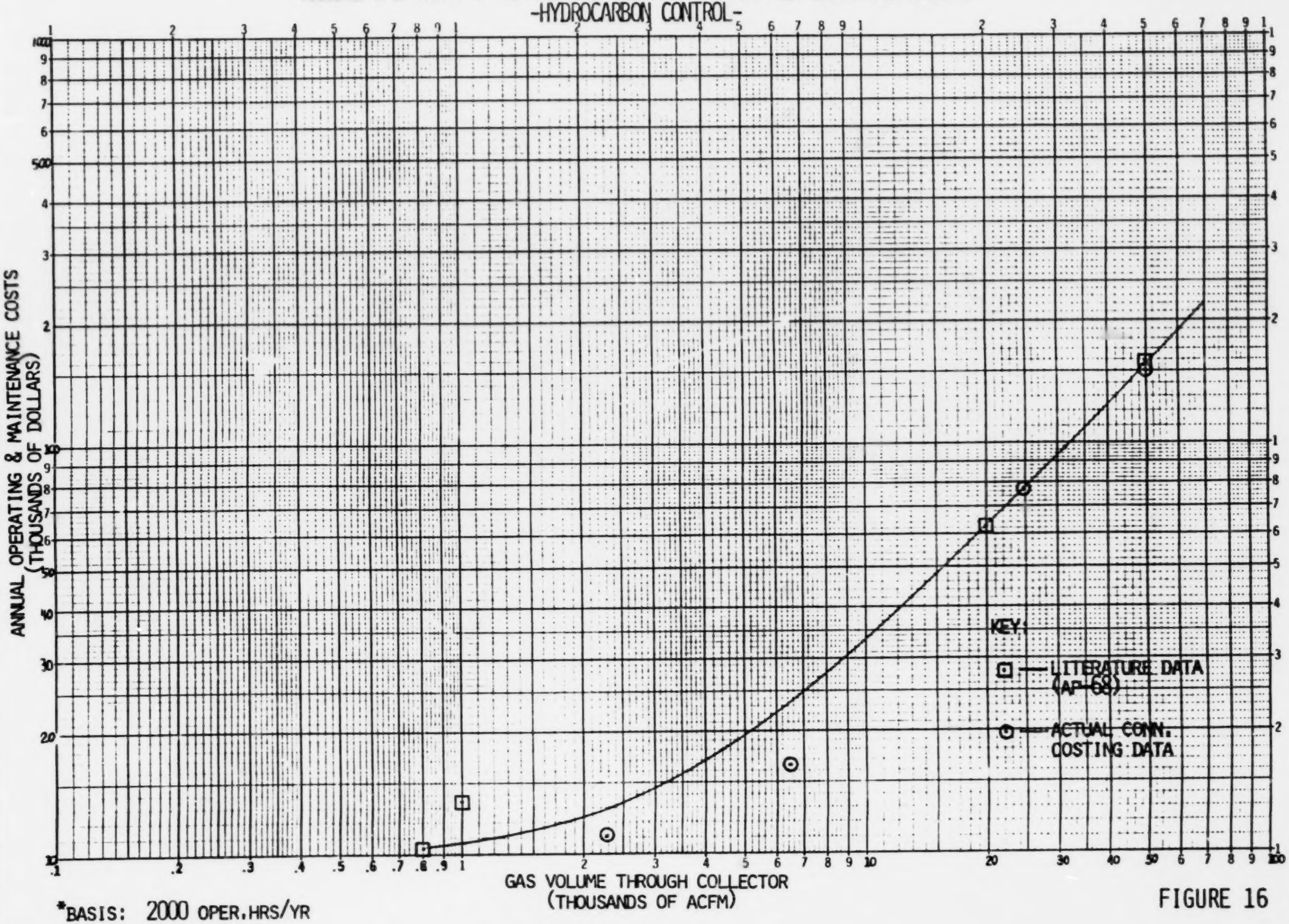


FIGURE 15

*BASIS: 2000 OPER.HRS/YR

K+E LOGARITHMIC 46 7320
KEUFFEL & ESSER CO.

ANNUAL OPERATING & MAINTENANCE COSTS OF ACTIVATED CARBON ADSORBERS*
-HYDROCARBON CONTROL-



*BASIS: 2000 OPER.HRS/YR

FIGURE 16

ANNUAL OPERATING & MAINTENANCE COSTS OF AFTERBURNERS*

-HYDROCARBON CONTROL-

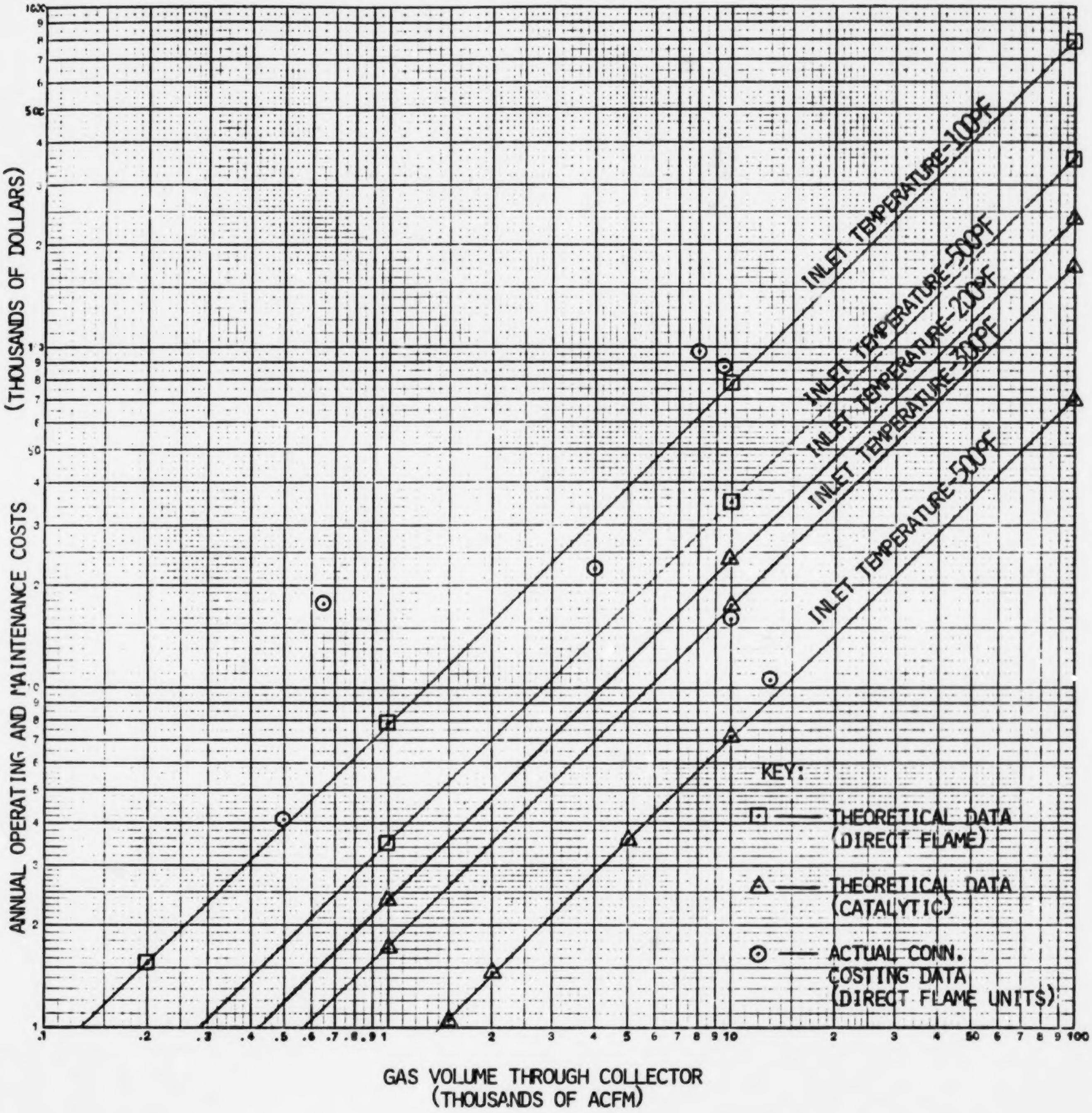


FIGURE 17

*BASIS: 2000 OPER.HRS/YR

THE COST OF OPERATING AND MAINTAINING EQUIPMENT

CARBON MONOXIDE

No Connecticut data for operating and maintaining afterburners for carbon monoxide control was available in the Department's files. Testing of this curve will take place as costs become available.

COST CURVE DATA, ADJUSTMENTS, AND INTERPRETATIONS:

OPERATING AND MAINTAINING EQUIPMENT

CARBON MONOXIDE CONTROL

Graph	Equipment	Major Data Source(s)	Adjustments	Fit With Conn. Cases	Comments
18	Afterburners, Direct and Catalytic	DS-7	DE	N.A.	The curve assumes: 1. no heat value from CO 2. no heat recovery employed 3. natural gas cost = \$2.40/1000 cu. ft. 4. temperature range for direct flame afterburner is 380°F to 1400°F 5. temperature range for catalytic afterburners is 380°F to 900°F

ANNUAL OPERATING & MAINTENANCE COSTS OF AFTERBURNERS*
-CARBON MONOXIDE (CO) CONTROL-

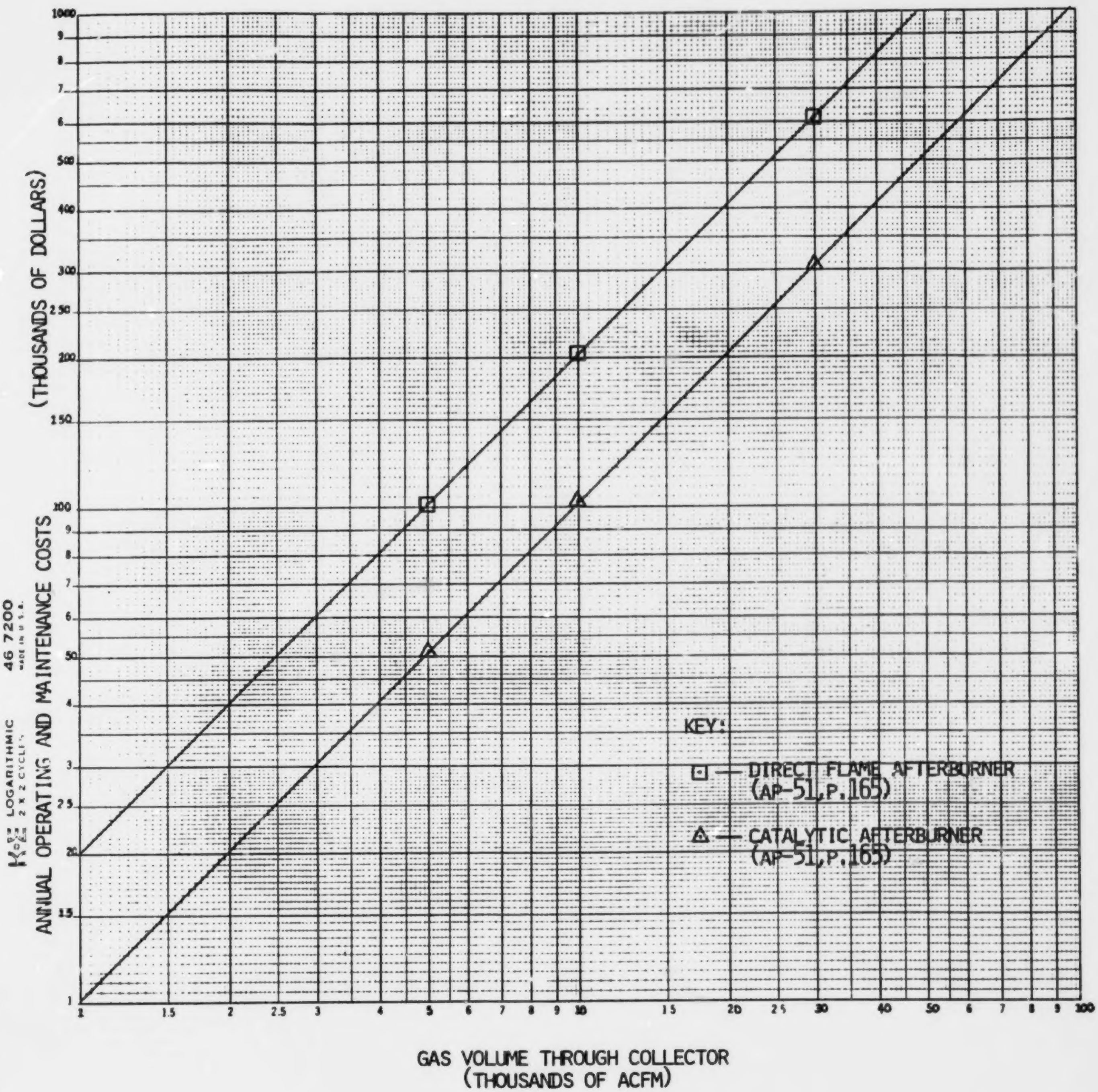


FIGURE 18

*BASIS: 8760 OPER. HRS/YR

THE COST OF OPERATING AND MAINTAINING EQUIPMENT

NITROGEN OXIDES

Unfortunately, the low number of both national and State data points makes it impossible to construct a reliable cost curve for operating and maintenance costs for nitrogen oxide control equipment. Two actual data points for Connecticut are available for comparative purposes, but only serve to form the basis of a cost curve. The Department hopes to assemble a greater data base in the near future.

COST CURVE DATA, ADJUSTMENTS, AND INTERPRETATIONS:

OPERATING AND MAINTAINING EQUIPMENT

NITROGEN OXIDE CONTROL

Graph	Equipment	Major Data Source(s)	Adjustments	Fit With Conn. Cases	Comments
19	Wet Scrubbers	DS-1	DE	N.A.	

ANNUAL OPERATING & MAINTENANCE COSTS OF WET SCRUBBERS*

-NITROGEN OXIDE (NOx) CONTROL-

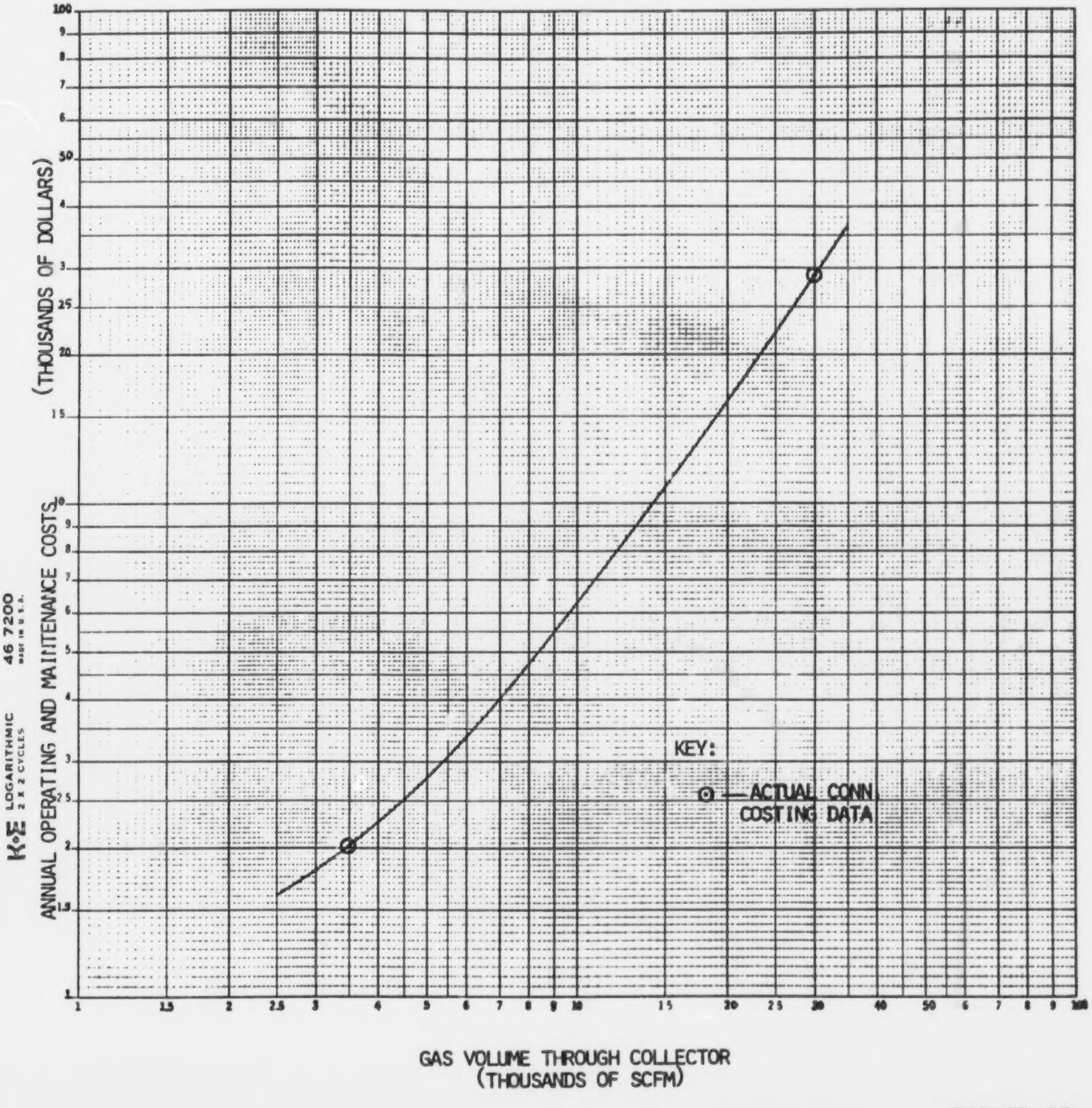


FIGURE 19

*BASIS: 2000 OPER.HRS/YR

THE COST OF OPERATING AND MAINTAINING EQUIPMENT

SULFUR OXIDES

The following table summarizes information concerning the graph on operating and maintaining sulfur oxide control equipment.

COST CURVE DATA, ADJUSTMENTS, AND INTERPRETATION

OPERATING AND MAINTAINING EQUIPMENT

SULFUR OXIDE CONTROL

Graph	Equipment	Major Data Source	Adjustments	Fit With Conn. Cases	Comments
19	Limestone Scubber	DS-6, 7	DE	N.A.	The curve measures millions of dollars of costs vs. megawatts per hour plant output

ANNUAL OPERATING & MAINTENANCE COSTS OF LIMESTONE WET SCRUBBERS*

-SULFUR OXIDE (SOx) CONTROL OF POWER PLANTS-

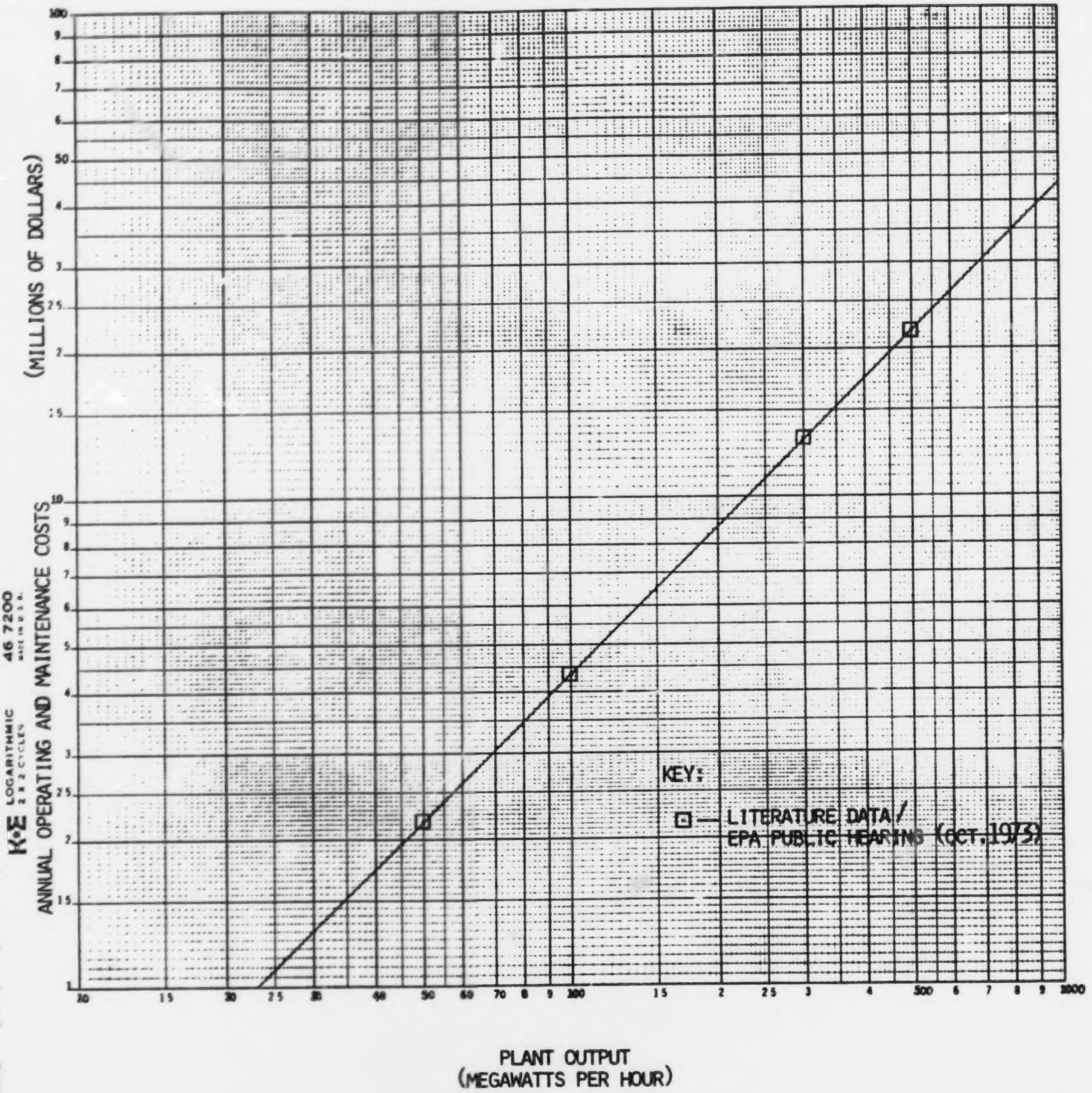


FIGURE 20

*BASIS: 8760 OPER.HRS/YR

COSTING WHEN CURVES MAY NOT BE ENOUGH

Although the cost of compliance can be estimated using the cost curves just outlined in most cases, there are a significant number of cases for which no curve has yet been developed; where the use of curves is complicated by the emission of several different pollutants from one source; or where there may be a choice between using an equipment-based curve or assuming another approach to control (e.g. reformulation or a change in fuel types). This section begins with a tabular discussion of the types of enforcement situation likely to run into these problems. It then goes on to a more thorough discussion of how best to approach costing in cases that involve multiple pollutant emissions or that propose control strategies other than the installation of control equipment.

SPECIAL COSTING APPLICATIONS

The Department is responsible for enforcing a number of emissions standards that may, at least in some situations, require other approaches to costing than the use of cost curves. The following table discusses each of these situations in the order in which they appear in the Department's Regulations. The table identifies what proportion of the current enforcement load each type of problem is and suggests how each can best be approached. (The table discusses cases where there is a violation of only one pollution standard; complex cases are covered immediately after the table.)

Approaches to Special Costing Situations

Pollutant and Violation	Percent of Connecticut Orders*	Special Application
Particulates (§19-508-18)		
Opacity (§18(a))	Less than 1 percent	Most opacity violations are found in conjunction with other particulate violations which require the installation of control equipment. In such cases the control costs for the second particulate violations will be adequate for the opacity violation as well. The major exception is for motor vehicles. While equipment control costs for motor vehicles have not yet been collected by the Department, there are currently plans for a cooperative enforcement venture with the Department of Transportation. The Department is now in the process of trying to establish reliable costing figures for motor vehicles.
Fugitive Dust (§18(b))	Less than 1 percent	Where the problem is due to a mechanical process, general treatment is applicable. But where the problem is caused indirectly (e.g. wind action on stockpiles, uncovered trucks, unkempt roads or parking lots) the engineer should attempt to estimate the costs of a more appropriate means of achieving compliance. Thus, for an uncovered truck, the applicable equipment cost would be the cost of a dust cover.
Incineration (§18(c))	It is uncertain how often alternative means of control can be contemplated	The Department will generally assume for costing purposes that incinerators will be controlled with wet scrubbers. However, where the engineer has knowledge

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*Includes only orders for emissions violations covered by Civil Assessment Regulations (e.g., violations of §§19-508-9 and 19-508-18 to 22).

Approaches to Special Costing Situations

Pollutant and Violation	Percent of Connecticut Orders	Special Application
		that an alternate means of waste disposal such as compaction is going to be used, he may either: (1) estimate the costs on the basis that a scrubber will be installed and leave to the correction process any errors resulting from this assumption, or (2) estimate alternate disposal costs. However, since DEP experience indicates that alternate disposal plans are often not carried out, the first costing technique should usually be carried out.
Fuel Burning Equipment (§18(d))	9	Since violations of the particulate standards by fuel burning equipment can be corrected by either control equipment or by renovation, the method of control chosen for costing purposes can be either: (1) an estimation of control equipment costs, with any errors stemming from this assumption to be corrected in the correction process, or (2) an estimation of the renovation costs. However, since DEP experience indicates that renovation is often unsuccessful, the first costing technique should usually be followed.

Pollutant and Violation	Percent of Connecticut Orders	Special Application
Hydrocarbons (§19-508-20)	9 (sum of both subcategories)	
Storage of Volatile Organic Compounds (§20(a)) Volatile Organic Compounds Loading Facilities (§20(b))		The typical control equipment employed at bulk wholesale oil terminals (floating roofs, vapor recovery systems, etc.) is not covered by the costing graphs. This omission reflects the fact that recent enforcement activity indicates that all bulk wholesale oil terminals are now in, or coming into, compliance. If any future violations are discovered, a case-by-case costing technique will be appropriate.
Volatile Organic Compound Water Separation (§20(c)) Pumps and Compressors (§20(d)) Waste Gas Disposal (§20(e))	Sections 20(c), (d) and (e) account for less than 1 percent of Connecticut orders.	The Department has very limited enforcement activity associated with these regulations. Since cost information is not now readily available from either Federal or State sources, the Department will proceed on a case-by-case costing basis until a reliable data base is available.
Organic Solvents (§20(f))	17 percent	Note the special applicability of the portion of this Section that explains non-equipment-based approaches to control. Note also three special characteristics of operating costs here: (1) For administrative ease, the cost curves do not include any consideration of reclamation or re-use of collected hydrocarbons. A source with such reclamation facilities can state its case in the correction process. (2) The predicted inlet temperature to the incinerator has a great effect on fuel requirements and thus costs. Such temperature should be carefully considered.

Approaches to Special Costing Situations

Pollutant and Violation	Percent of Connecticut Orders	Special Application
		(3) For administrative ease, the cost curves do not include consideration of the costs or benefits of heat recovery in fume incineration. Once again, a source with such costs or benefits has ready access to the correction process for appropriate adjustments.
Architectural Coatings (§20(g))	Sections (g) and (j) account for less than 1 percent of Connecticut orders.	
Disposal and Evaporation of Solvents (§20(j))		
Carbon Monoxide (§19-508-21)	0	The CO cost curve: (1) assumes that an afterburner installed to control cupola emissions will be built as a separate facility, and (2) does not reflect the costs or benefits of heat recovery systems. Adjustments for this assumption or omission should be taken care of in the correction process.
Nitrogen Oxides (§19-508-22) Combustion Sources (§22(a))	Less than 1 percent	The costs of reconditioning and maintaining a combustion source will usually be the only costs needed to keep a source within standards. However, at present there is both uncertainty in retrofit control technology and a scarcity of reliable cost data. Until better information is available, DEP engineers will make the best available estimate and will use the deferred collection device (See Section H of Chapter II of this Part) frequently.

Approaches to Special Costing Situations

Pollutant and Violation	Percent of Connecticut Orders	Special Application
Sulfur Oxides (§19-508-19) Fuel Combustion (§19(a))	Less than 1 percent	In most cases, the cost of control for violation is simply the cost of using low-sulfur fuel. The difference between the cost of high- and low- sulfur fuel fluctuates rapidly; no specific costs are noted here. Cost will usually be calculated by multiplying the cost differential times the number of gallons used. Note however that in the appropriate case, cost curves 10 and 20 provide adequate costing information where auxiliary control equipment is contemplated as the means of control. In such a case, the engineer should be sure to ascertain the power generation of the fuel burning since this is the costing parameter used in the curves.
(§19-508-19) Sulfuric Acid Plants (§19(b)) Sulfur Recovery Plants (§19(c)) Nonferrous Smelters (§19(d)) Sulfite Pulp Mills (§19(e)) Other Process Sources (§19(f))	Less than 1 percent	Costing data on these processes remains scarce and generally unreliable. Fortunately, such sources are rare in Connecticut, comprising only 2 percent of the total SO_X emission in the State. When a case does arise involving these regulations, the Department will make a case-by-case costing analysis and make use of the deferred collection device.

* * * * * * * * * * * * * *

COSTING MULTI-VIOLATION CASES

There are two bases of cost estimation for those cases where a source has been cited for violating more than one of the emissions standards defined in §§19-508-18 through 19-508-22 of the Regulations. The first is to estimate that the source can be brought into compliance by one control system (a baghouse, a scrubber, etc.). The second is to estimate that the multiple violation will require installation of several control systems.

For example, consider a source which is cited for violations of "Visible Emissions", §19-508-18(a)(1), and "Organic Solvents", §19-508-20(f)(1), due to the emission of high molecular weight hydrocarbons from a process such as a fabric tinter frame. In this case, one piece of control equipment will correct both violations (e.g. an electrostatic precipitator or a fume incinerator). The engineer choosing the control technique should be careful to ensure that the strategy chosen offers the greatest assurance of achieving compliance for both violations.

On the other hand, consider a source which is cited for violations of "Process Industries (Particulate Control)", §19-508-18(f)(1), and "Control of Carbon Monoxide Emissions", §19-508-21(2), for a grey iron cupola. For a case such as this, control requires two separate abatement strategies (i.e. a high energy scrubber to control particulate emissions and a fume incinerator to control carbon monoxide emissions). The engineer doing the costing should make the two costing estimates separately and then add them for a final figure. He should, however, take care not to double count certain costs (e.g. start-up, engineering) that would not necessarily double because two systems rather than one were being installed.

COSTING VIOLATIONS OF THE GENERAL PROHIBITION OF AIR POLLUTION

Section 19-508-9 prohibits air pollution not otherwise covered by explicit standards put forth elsewhere in the Regulations. The language of the Section, "No person shall permit or cause air pollution...," in effect requires that control techniques eliminate 100 percent of any and all emissions. Therefore, where a source is cited for a violation of this Section, a civil assessment might plausibly be based upon the profits realized from continued operation of the emission source (i.e. the costs of not not operating). However, the information required to make such an assessment would be very difficult to obtain. For administrative ease in such cases, the Department will usually attempt to use the cost curve which is most closely applicable to the general emission problem. However, the choice of a control technique for costing purposes does not negate the clear language of §19-508-9 which requires 100 percent control.

COSTING ABATEMENT BY MEANS OTHER THAN CONTROL EQUIPMENT

There are pollution problems which are often solved other than through the use of control equipment. (Some of these cases were specifically noted in the special applications table.) When, as is usually the case, control can be achieved through the use of equipment as well, costing should generally proceed on the assumption that control will be achieved using control equipment rather than through reformulation or other control techniques.

This general rule rests on the following major considerations:

- In the Department's enforcement experience, abatement by means other than control equipment is often unsuccessful. Despite a source's initial expectations and hopes, control equipment is still the usual solution to most pollution problems.
- It would be both difficult and expensive to obtain accurate costing data for many non-equipment approaches to control. For example, costing individual reformulation efforts, especially in the early research stages, would be a tricky, time-consuming job.
- Use of the Department's equipment-based cost curves ensures that cases with similar pollution problems are assessed equally, regardless of any difference in their approach to coming into compliance.
- Even if cost estimates based on the assumption that control is achieved with abatement equipment later prove too high, regulatees are entirely protected against loss by their right of correction and refund of any overassessment with interest.

* * * * * * * * * * * * * * *

CONCLUSION

The Department can make quick, reliable estimates of the costs of compliance for almost all violations of the substantive emissions standards enforced by its civil assessment regulations, (§§19-508-9 and 19-508-18 through 19-508-22 of The Regulations For the Abatement of Air Pollution). It is able to do so chiefly by using the cost curves it has developed and tested that describe the relationship that exists between costs and the volume of air that must be processed and the type of pollutant involved. The coverage and accuracy of these curves will increase as the State and national data base improves.

APPENDIX A

ADJUSTING COST DATA FOR INFLATION

APPENDIX A

ADJUSTING COST DATA FOR INFLATION

This Appendix explains the method used in this Section of adjusting costs for inflation. This adjustment ensures that all cost estimates used in the previous Section reflect July, 1974 values. The general equation has two cost components: (1) a materials cost index (the Marshall and Swift index), and (2) a labor cost index (the Engineering News Record/Construction Cost Index). These two components were averaged, using the labor/materials ratio appropriate to each piece of equipment.

GENERAL EQUATION FOR COST ESCALATION[1]:

$$IC_x = IC_b \quad (1-0.5\ (L/M))\ \frac{MS_x}{MS_b} \quad + 0.5\ (L/M)\ \frac{ENR_x}{ENR_b}$$

Where IC_x = Estimated installed cost of equipment in Year X

IC_b = Estimated installed cost of equipment in a given base Year B

L/M = Labor to material ratio of equipment to be costed, as given in Figure 7 of Blecker & Cadman.

MS = Marshal & Swift Index, Process Industries Average for Year X or Base Year B (found in Table 8 of reference or in regular reports "Economic Indicators" published in Chemical Engineering).

ENR = Engineering News Record/Construction Cost Index for Year X or Base Year B (found in Table 8 of reference or in regular reports "Economic Indicators" published in Chemical Engineering).

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[1] Blecker, H. G. & T. W. Cadman, "Capital & Operating Cost of Pollution Control Equipment Modules," Vol. 1, E.P.A., Office of Research & Monitoring, Washington, D. C., Publication No. EPA - R5 - 73 - 0232, pages 73-80.

L/M RATIOS USED:

(1) PARTICULATE CONTROL - L/M = 0.796

(2) FUME INCINERATORS - L/M = 0.944

(3) SO_x SCRUBBERS - L/M = 0.5

(4) ACTIVATED CARBON ADSORBERS - L/M = 1.0

(5) NO_x SCRUBBERS - L/M = 0.5

AN EXAMPLE:

EXAMPLE PROBLEM = A source installed a scrubber in 1965 at a cost of $8,980 to control nitrogen oxide emissions. Estimate the cost of installing that same scrubber in July, 1974.

EXAMPLE SOLUTION

$$IC_b = IC_{1965} = \$8,980$$

$$L/M = 0.5$$

$$MS_x = MS_{7/1974} = 386$$

$$MS_b = MS_{1965} = 244$$

$$ENR_x = ENR_{7/1974} = 2075$$

$$ENR_b = ENR_{1965} = 971$$

$$\therefore IC_x = IC_{7/74} = \$8,980 \ldots \left[(1-0.5(0.5))\ \frac{386}{244} + 0.5(0.5)\ \frac{2075}{971}\right]$$

$$\Rightarrow IC_{7/74} = 8,980 \quad \left[.75\left(\frac{386}{244}\right) + .25\left(\frac{2075}{971}\right)\right]$$

$$\Rightarrow IC_{7/74} = 8,980 \quad \left[1.19 + .53\right]$$

$$\Rightarrow IC_{7/74} = 8.980 \quad \left[1.72\right]$$

$$\therefore IC_{7/74} = \$15,446$$

APPENDIX B

CALCULATING OPERATION AND MAINTENANCE COSTS

APPENDIX B

CALCULATING OPERATING AND MAINTENANCE COSTS

This Appendix presents the methods used to calculate cost estimates for the operation and maintenance of each kind of pollution control equipment discussed in this Section. For control of particulates and carbon monoxide, the Appendix includes the general equations for each piece of equipment, the variables used to simplify these equations, and the final functions used in Graphs 11 through 20 in this Section. The hydrocarbon and sulfur oxides sections include sample calculations. Since the Department will base cost estimates for nitrogen oxide control equipment on actual Connecticut data, calculations of these costs are not included.

PARTICULATE AND CARBON MONOXIDE CONTROL

COLLECTOR	GENERAL EQUATIONS[1]
1. Wet Scrubbers	$G=S\left[0.7457\ HK\ Z+\frac{Qh}{1980}+WHl+M\right]$
2. Electrostatic Precipitators	$G=S\left[JHK+M\right]$
3. Fabric Filters	$G=S\left[195.5 \times 10^{-6}\ PHK+M\right]$
4. Afterburners	$G=S\left[195.5 \times 10^{-6}\ PHK+HF+M\right]$

WHERE:

G = Annual operating and maintenance cost (dollars)

S = Unit design capacity (ACFM)

P = Pressure drop (inches of water)

H = Annual hours of operation (hours)

h = Elevation for pumping of liquid in circulation system for collector (feet)

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[1] "Control techniques for Particulate Air Pollutants," EPA, Office of Air Programs, Research Triangle Park, N.C., Publication No. AP-51, pages 162-166.

K = Electricity cost (dollars per kilowatt hour)

M = Maintenance cost per ACFM (dollars per ACFM)

F = Fuel costs (dollars per ACFM per hour)

W = Liquid make-up rate (gallons per hour per ACFM)

L = Liquid cost (dollars per gallon)

Z = Total power input required for a specified scrubbing efficiency (horsepower per ACFM)

J = Kilowatts of electricity per ACFM

Q = Water circulation (gallons per ACFM)

ASSUMPTIONS:

1. H = 8760 hours/year = Annual hours of operation
2. K = $0.060/KW-hr = Electricity cost[2]
3. Afterburners use natural gas as fuel at cost of $2.40/1000 Cu. Ft.[3]
4. Afterburners use 50 percent excess air with operational temperature of 1400°F (Direct Flame) and 900°F (Catalytic).

FINAL ANNUAL OPERATING AND MAINTENANCE COST EQUATIONS USED IN THE GRAPHS IN SECTION A ARE:

COLLECTOR	EQUATION
1. Wet Collector	G = S (3.78)
2. Electrostatic Precipitators	G = S (0.198)
3. Fabric Filters	G = S (0.682)
4. Afterburners	
a. Direct Flame	G = S (20.2)
b. Catalytic	G = S (10.23)

---

[2] United Illuminating cost information, October, 1974.

[3] CNG cost information, 10/28/74.

HYDROCARBON CONTROL

1. CARBON ADSORBERS:

GIVEN: A) Operating cost for units of 1000 CFM size range = \$6.80 - \$8.00/CFM[4]

B) Operating cost for units of 50,000 CFM size range = \$1.54 - \$1.70/CFM[4]

C) Operating costs have increased by a factor of two between 1969 and July, 1974 due to inflated fuel and power costs.

EQUIPMENT SIZE (ACFM)				OPERATING COSTS
800	=	800 (\$6.80)2	=	\$10,100
1000	=	1000 (\$6.80)2	=	\$13,600
20,000	=	20,000 (\$1.54)2	=	\$62,000
50,000	=	50,000 (\$1.54)2	=	\$154,000

2. AFTERBURNERS:

GIVEN: A) Heating value of contaminants is negligible.

B) Fuel costs are proportional to CFM incinerated.

C) Fuel costs are proportional to temperature change.

D) Direct flame afterburner will require 1400°F exhaust.

E) Catalytic afterburner will require 700°F exhaust.

F) Combustion air will be taken from gas to be incinerated.

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[4] Control Techniques: "Hydrocarbons and Organics," EPA, Office of Air Programs, Research Triangle Park, N.C., Publication No. AP-68, P. 6-4 (1969 Data).

G) Natural gas has gross heating value of of 1005 BTU/ft^3.

H) Combustion air required is 9.53 ft^3 air/ft^3 gas.

I) Annual hours of operation are 2000 hours/year.

J) Natural gas cost is \$2.40/1000 ft^3.

SAMPLE CALCULATION:

BASIS: exhaust at 600°F to be incinerated in direct flame afterburner (i.e. 1400°F exhaust)

1) Calculate ΔH per lb. MOLE to obtain heating requirements.

$$\Delta H = Cp_{32-1400}\ (\Delta T) - Cp_{32-600}\ (\Delta T)$$

$$= 7.382\ (1400 - 32) - 7.060\ (600 - 32)$$

$$= 6088 \text{ BTU/lb. MOLE air}$$

2) Calculate natural gas requirements

∴ Gross heat value at 60°F = 1005 $^{BTU}/_{ft^3}$
available heat at 1400°F = 649 $^{BTU}/_{ft^3}$ gas

→ Gas req'd / lb MOLE air = $\dfrac{\text{Heat req'd}}{\text{Heat avail.}}$

$$= \frac{6088 \text{ BTU/lb MOLE air}}{649 \text{ BTU/ft}^3 \text{ gas}}$$

$$= 9.38 \text{ ft}^3 \text{ gas/lb MOLE air}$$

3) Calculate combustion air
→ 9.38 x 9153 = 89 ft^3 combustion air

4) Calculate air volume incinerated
→ 379 ft^3 / lb MOLE air at 77°F
89 ft^3 combustion air
468 ft^3 air per 9.38 ft^3 gas

5) Correct to 100 CFM basis
→ $\frac{1000}{468} \times 9.38 = 20.04$ ft^3 gas/ 1000 CFM air

6) Annual costs for inlet temperature to incinerator of 77°F

$$= 20/04 \ \frac{ft^3 \text{ gas}}{1000 \ ft^3 \text{ air}} \times 1000 \text{ CFM} \times \frac{\$2.40}{1000} ft^3 \times 60 \ \frac{min}{hr}$$

$$\times \ 2000 \ hr/yr$$

7) Annual cost of inlet temperature to incinerator of 600°F

➡ $$\$5772 \times \frac{(77 + 459)^{\circ}R}{(600 + 459)^{\circ}R}$$

= $2909/1000 CFM gas volume

THEREFORE

TABLE 1 - DIRECT FLAME AFTERBURNER

TEMP. OF AIR TO AFTERBURNER	ANNUAL COST PER 1000 CFM OF AIR (VOLUME MEASURED AT TEMP. TO AFTERBURNER)
1000 °F	$1,190
800	1,945
600	2,909
500	3,513
400	4,246
300	5,142
200	6,269
100	7,844

TABLE 2 - CATALYTIC AFTERBURNER

TEMP. OF AIR TO AFTERBURNER	ANNUAL COST PER 1000 CFM OF AIR (VOLUME MEASURED AT TEMP. TO AFTERBURNER)
600 °F	$ 330
500	712
400	1,163
300	1,714
200	2,405
100	3,322

SULFUR OXIDE CONTROL

OPERATING COST RANGE

FEDERAL STUDY[5]	(P - 7)	2-4 MILLS/KW-HR
D.E.P. STUDY[6]	(P - 16)	4-8 MILLS/KW-HR

taking average of each range gives:

FEDERAL STUDY	3 MILLS/KW-HR
D.E.P. STUDY	6 MILLS/KW-HR
	9 MILLS/KW-HR ÷ 2

➡ OVERALL AVERAGE ≅ 5 MILLS/KW-HR

SAMPLE CALCULATION FOR DATA POINTS:
for 50 MW PLANT & 8760 HRS/YR

50,000 KW x 8760 hrs/yr x ($0.005/KW-HR)

∴ ANNUAL COST = $2,190,000

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[5] National Public Hearings on Power Plant Compliance with Sulfur Oxide Air Pollution Regulations, E.P.A., Public Affairs Office, Washington, D.C., Jan. 1974.

[6] Task Force Report on Coal Conversion, Conn. D.E.P., Aug. 1974.

APPENDIX C

THE CONNECTICUT CASES:
COST CURVE ESTIMATES AND ACTUAL COSTS COMPARED

(INSTALLED EQUIPMENT
AND MAINTENANCE COSTS)

THE CONNECTICUT CASES: ACTUAL AND ESTIMATED COSTS

COMPANY	LOCATION	ACFM	ADJUSTED CO. INSTALLED COSTS (DOLLARS)	ESCALATED 7/74 INSTALLED COSTS (DOLLARS)	ESTIMATE FROM APPLICABLE GRAPHS (DOLLARS)	PERCENT DIFFERENCE BETWEEN ESTIMATED AND ACTUAL COSTS
Rogers Corp.	Manchester	6,000	9,770	13,400	20,500	+53
Rogers Corp.	Manchester	16,000	24,300	28,400	43,000	+51
U.S.M. Corp.	Shelton	1,120	1,500	1,940	4,900	+153
SCRUBBERS:						
Emhart	Berlin	15,800	11,700	18,300	30,000	+84
Emhart	Berlin	19,000	15,300	23,900	34,000	+47
Emhart	Berlin	19,200	14,400	22,500	34,050	+51
Emhart	Berlin	21,850	16,200	25,300	37,500	+48
Emhart	Berlin	24,000	20,700	32,300	40,000	+24
Olin	New Haven	20,000	24,000	30,960	35,200	+14
Pfizer	Groton	250	13,500	17,400	12,000	-31
Pfizer	Groton	800	13,500	17,400	11,500	-34
Pfizer	Groton	1,100	7,200	13,600	12,400	- 9
Silliman Co.	Bridgeport	41,333	54,000	70,700	58,500	-18
Stewart Warner	Bridgeport	10,000	9,630	18,200	23,200	+27
Uniroyal	Naugatuck	6,400	7,470	15,800	18,400	+16
Uniroyal	Naugatuck	12,000	11,970	23,500	25,600	+ 6
Walter Kidde	New Haven	10,000	11,700	21,650	23,200	+ 7
Walter Kidde	New Haven	30,000	26,100	48,300	46,000	- 4
Walter Kidde	New Haven	40,000	28,800	53,280	58,000	+ 9
II. HYDROCARBON CONTROL:						
CARBON ADSORBERS:						
American Cyanamid	Wallingford	2,300	130,000	143,000	155,000	+ 8
American Cyanamid	Wallingford	6,500	240,000	255,000	228,000	-11
Columbia Magnetics	Danbury	25,000	700,000[1]	700,000	480,000	-31
Dexter Corp.	Windsor Locks	50,000	424,000	466,400	750,000.	+61
AFTERBURNERS (DIRECT FLAME):						
ASCO Wire	Bridgeport	500	12,000	14,000	14,600	+ 4
E.J. Gaisser Corp.	Stamford	13,000	50,000	58,500	53,000	- 9
General Electric	Bridgeport	650	15,000	16,600	15,600	- 2
Goodrich	Shelton	10,000	54,300	63,000	44,000	-30
Stafford Printers	Stafford	4,000	25,000	28,000	26,400	- 6
III. CARBON MONOXIDE CONTROL:						
AFTERBURNERS:						
Plainville Casting	Plainville	57,000	16,420	19,200	81,000	+322

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[1] Installed cost does not include estimated $330,000 for distillation still.

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THE CONNECTICUT CASES: ACTUAL AND ESTIMATED COSTS

COMPANY	LOCATION	ACFM	ADJUSTED CO. INSTALLED COSTS (DOLLARS)	ESCALATED 7/74 INSTALLED COSTS (DOLLARS)	ESTIMATE FROM APPLICABLE GRAPHS (DOLLARS)	PERCENT DIFFERENCE BETWEEN ESTIMATED AND ACTUAL COSTS
1. PARTICULATE CONTROL						
ELECTROSTATIC PRECIPITATORS:						
National Gypsum	Bridgeport	27,000	82,000	173,000	129,000	-25
N.E. Utilities	Middletown	424,000	459,900	887,600	680,000	-23
United Illuminating	Bridgeport	164,000	432,900	800,900	360,000	-55
United Illuminating	Bridgeport	859,000	1,119,000	1,779,000	1,160,000	-35
BAGHOUSES:						
American Cyanamid	Wallingford	500	3,600	6,050	2,450	-60
American Cyanamid	Wallingford	500	3,600	6,230	2,450	-61
American Cyanamid	Wallingford	500	5,400	8,050	2,450	-70
American Cyanamid	Wallingford	600	2,250	3,900	2,900	-26
American Cyanamid	Wallingford	800	2,700	4,670	3,700	-21
American Cyanamid	Wallingford	800	3,600	4,640	3,700	-20
Ashland Oil	New Britain	58,000	112,500	189,000	124,000	-34
Gulf	Newington	17,000	33,620	39,300	45,000	+15
Gulf	Newington	34,100	82,603	94,200	79,000	-16
Gulf	Newington	98,000	177,980	202,900	195,000	- 8
Blakeslee	Branford	1,500	8,883	11,460	6,300	-45
Blakeslee	Hamden	400	1,300	1,520	2,050	+35
Blakeslee	New Haven	400	900	1,050	2,050	+95
Blakeslee	New Haven	800	2,800	3,300	3,700	+12
Carpenter Tech.	Bridgeport	93,000	108,650	182,500	183,000	+.3
Carpenter Tech.	Bridgeport	186,000	214,130	370,500	1,600,000	+361
Cerro Wire	New Haven	7,000	14,200	16,600	28,500	+72
Cerro Wire	New Haven	20,000	30,600	35,800	51,750	+45
Dart Inc.	New Haven	1,200	1,732	2,900	5,250	+81
D. J. Carten	Milford	600	3,202	3,600	2,900	-19
D. J. Carten	Milford	600	3,373	4,000	2,900	-28
Emhart	Berlin	8,000	35,350	48,100	26,500	-45
ESB, Inc.	Fairfield	7,000	22,770	39,400	24,500	-38
Cerro Corp.	Norwalk	300	1,200	1,700	1,600	- 6
General Electric	Bridgeport	2,560	4,530	5,670	9,800	+73
General Electric	Bridgeport	6,300	26,230	34,360	21,500	-37
General Electric	Bridgeport	7,200	16,150	24,100	25,000	+ 4
General Electric	Bridgeport	7,200	17,100	22,400	25,000	+12
General Electric	Bridgeport	12,500	56,700	62,900	36,500	-42
MacDermid	Waterbury	1,000	3,600	4,900	4,450	- 9
[illegible] Steel Casting	Branford	20,000	51,120	65,900	51,750	-21
Ottawa Silica	N.Stonington	24,000	32,085	53,900	59,000	+ 9
Philbrick, Booth & Spencer	Hartford	22,000	29,700	38,300	55,000	+44

THE CONNECTICUT CASES: ACTUAL AND ESTIMATED COSTS

IV. NITROGEN OXIDE CONTROL:

SCRUBBERS:

COMPANY	LOCATION	ACFM	ADJUSTED CO. INSTALLED COSTS (DOLLARS)	ESCALATED 7/74 INSTALLED COSTS (DOLLARS)	ESTIMATE FROM APPLICABLE GRAPHS (DOLLARS)	PERCENT DIFFERENCE BETWEEN ESTIMATED AND ACTUAL COSTS
Company X[2]	Waterbury	30,000	100,000	100,000	100,000	0
Company Y[2]	Wallingford	100	----	6,000	6,000	0
Handy & Harmon	Fairfield	3,500	8,980	12,600	12,000	- 5

V. SULFUR OXIDE CONTROL:

LIME-LIMESTONE WET SCRUBBERS:

COMPANY	LOCATION	UNIT SIZE (MEGAWATTS)	LISTED[3] CAPITAL COSTS ($/KW)	ESCALATED[3] CAPITAL COSTS ($/KW)	ESTIMATE FROM APPLICABLE GRAPHS ($/KW)	PERCENT DIFFERENCE BETWEEN ESTIMATE AND ACTUAL COSTS
Commonwealth Edison	Illinois	155	180	126.36	177	+40
Detroit Edison	Michigan	170	80	80	102	+26
Duquesne Light	----	380	72.5	80.48	82	+ 2
N. E. Utilities	Conn.	193	96.1	96.1	96.5	+ .4
N. E. Utilities	Conn.	338	83.7	83.7	83.5	- .2
Public Service Co. of Indiana	Indiana	880	68	75.48	75	- .6
Public Service Co. of Indiana	Indiana	880	66	73.26	75	+ 2

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[2] Company requested that cost data be kept confidential.

[3] Estimated costs

APPENDIX D

THE CONNECTICUT CASES:
COST CURVE ESTIMATES AND ACTUAL COSTS COMPARED

(OPERATION & MAINTENANCE COSTS)

THE CONNECTICUT CASES: ACTUAL AND ESTIMATED COSTS

COMPANY	LOCATION	ACFM	ADJUSTED ANNUAL OPERATING COSTS ($) (8760 HRS/YR)	ESTIMATE FROM APPLICABLE GRAPHS (DOLLARS)	PERCENT DIFFERENCE BETWEEN ESTIMATED AND ACTUAL COSTS
I. PARTICULATE CONTROL					
A. ELECTROSTATIC PRECIPITATORS:					
United Illuminating	Bridgeport	164,000	33,900	33,500	- 1
United Illuminating	Bridgeport	327,350	72,960	65,000	-11
United Illuminating	Bridgeport	859,000	74,460	170,000	+128
B. BAGHOUSES:					
D. J. Carten	Milford	600	626	410	-35
Emhart	Berlin	3,500	2,890	2,350	-19
Stewart Warner	Bridgeport	1,300	1,580	850	-46
C. SCRUBBERS:					
Keller Pottery	Berlin	13,000	34,020	48,000	+41
Silliman Co.	Bridgeport	41,333	164,400	155,000	- 6
Walter Kidde	New Haven	10,000	23,340	37,000	+59
Walter Kidde	New Haven	40,000	37,080	147,020	+298
II. HYDROCARBON CONTROL					
A. CARBON ADSORBERS					
American Cyanamid	Wallingford	2,300	11,000	13,000	+18
American Cyanamid	Wallingford	6,500	16,500	23,500	+42
Columbia Magnetics	Danbury	25,000	77,200	77,300	+.1
Dexter Corp.	Windsor Locks	50,000	165,000	155,000	- 6
B. AFTERBURNERS (DIRECT FLAME)					
ASCO Wire	Bridgeport	500	4,100	3,900	-5
E. J. Gaisser Corp.	Stamford	13,000	10,500	10,300	- 2
General Electric	Bridgeport	650	17,800	5,100	-71
Goodrich	Shelton	10,000	16,000	78,000	[illegible]
Stafford Printers	Stafford	4,000	22,200	31,000	+40
R. R. Donnelly[1]	Old Saybrook	9,300	83,000	72,000	-16
III. NITROGEN OXIDE CONTROL:					
SCRUBBERS:					
Company X[2]	Waterbury	30,000	29,000	29,000	0
Handy & Harmon	Fairfield	3,500	2,000	2,000	0

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[1] Catalytic Afterburner

[2] Company's name withheld for confidentiality.

SECTION B

DETERMINING THE APPLICABLE COST OF CAPITAL

The cost of capital is defined as the price demanded by tomorrow's suppliers of capital. Simply, it is the aggregate cost of borrowing or otherwise raising money. Also by definition, it is the minimum rate of return required to justify a capital investment.

The cost of capital is an important variable in the civil assessment calculation for two reasons. First, it is used to discount the costs of compliance to a present value; and, second, it is used to determine the assessment amount that, if imposed monthly over the full life of a project, will equal the present value of the costs of compliance. In both cases it works as a measure of the value to the regulatee of money over time -- how much it costs to make an expenditure now rather than later (and *vice versa*).

This Section (1) discusses how to determine the appropriate cost of capital rate for a particular case and (2) outlines how to update the table of cost of capital rates used in setting individual assessments from time to time.

DETERMINING THE COST OF CAPITAL FOR AN INDIVIDUAL REGULATEE

To find the cost of capital for an individual source,

A. Locate the regulatee in the alphabetical listing of manufacturers in the *Connecticut Manufacturing Directory* and note the two-digit code next to its name. This is the Standard Industrial Classification code number. A sample source entry follows at the end of this explanatory section.

B. If a source is not listed by name in the alphabetical listing of the *Directory*, find the Standard Industrial Classification which most closely approximates the type of regulatee with which you are concerned. A description of these classifications is found at the front of the *Connecticut Manufacturing Directory*, and is reproduced at the end of this section. Note the two digit code.

C. Once you have the two-digit code, find the cost of capital from the following cost of capital table:

UPDATING THE COST OF CAPITAL TABLE

The cost of capital figures in the preceding table represent industry-wide averages derived from a weighted cost of capital methodology. This methodology will be explained in some detail so that the table can be updated on an annual or semi-annual basis to reflect changes in capital structures and capital markets.

To derive a weighted cost of capital for any industry requires:

(a) the industry debt/equity ratio

(b) the industry cost of debt

(c) the industry cost of equity

Finding The Debt/Equity Ratio

The best source for determining the ratio between debt and equity for any industry is the Federal Trade Commission's Quarterly Report for Manufacturing Corporations. To calculate the debt/equity ratio for the various standard industrial classifications listed in the cost of capital table:

(1) locate the balance sheet for a given SIC code

(2) add up all liabilities other than current liabilities (this is the debt component)

(3) locate the item "stockholders' equity"

(4) calculate the ratio between debt and equity

EXAMPLE:

Debt: From the balance sheet for "Stone, Clay, Glass Products" which is reproduced at the end of this section, add up all liabilities other than "current liabilities"

```
 932
2951
 915
  35
----
4833 = DEBT
```

Equity: From the balance sheet for Stone, Clay, Glass Products, find the entry, stockholders' equity.

Stockholders' equity = 11,064 = EQUITY

Debt/Equity Ratio

		%	
DEBT	4833	30	(15,897 divided by 4833)
EQUITY	11064	70	(15,897 divided by 11064)
TOTAL	15897	100	

For this industry, the debt/equity ratio is .3/.7

The FTC Quarterly Reports may not include all the industry groupings that are needed to complete the cost of capital table. If an industry is not included in the FTC report, there are two alternative sources to use:

(1) Financial Dynamics, a business looseleaf publication, gives annual financial analyses for selected industries.

(2) The Internal Revenue Service's Corporation Income Tax Returns, a publication which includes industry-wide balance sheets.

Reproductions of the balance sheets from these two sources follow at the end of this section. Note that although the IRS publication date is 1969, an updated 1974 version will be available soon. If you use either of these alternative sources of debt and equity structure, calculate the debt/equity ratio in the same manner as described above.

Finding The Cost of Debt

The cost of debt varies with (1) changes in national interest rates and (2) the risk of lending to each particular debtor. Except for a small number of extremely risky situations, most of the variation in the cost of debt is a function of the first of these factors.

Consequently, for most cases the Department should simply assume that a commercial regulatee has an "A" bond rating, the statewide industrial average, and apply the interest rate then prevailing on "A"-rated bonds to determine that regulatee's debt cost. The cost of debt to most companies does not vary widely from the rate charged "A"-rated firms. Assuming an "A" rating in other words, does not cause the resulting assessments to be significantly inaccurate. It still allows the debt cost component of the cost of capital to reflect the major swings in interest costs, and it simplifies calculating the cost enormously.

All a member of the Department need do is determine what interest "A"-rated corporate bonds yield in the market at the time. This information is available in the financial press (e.g. Barron's), over the phone from a bank or brokerage house, or from Standard and Poor's monthly bond summary.

Very small or obviously risky companies may have a significantly higher cost of debt. In these cases, the Department can require the company to report what it has had to pay for recent loans, check its claims with the creditor, and use this figure for the cost of debt. This is clearly a much more time-consuming option than simply applying the cost of issuing "A"-rated bonds.

Note that the cost of debt is the cost of raising debt now, not the average cost of all a firm's outstanding debt. Large firms with long-term bonds issued years ago at 2 and 3 percent rates of interest will have a low average cost of debt, but they will not be deceived by this fact. They know that they will have to be paying current rates for any new investments they make.

However, the time cost of debt must be adjusted for the income tax deduction for interest payments allowed by the tax code. Thus, it will be necessary to multiply the interest rate paid on "A" bonds by the reciprocal of the regulatee's income tax rate (in most cases assumed to be 48 percent for corporations: see Part III, Chapter IV). After 48 percent of every dollar of interest cost is returned to a firm as a reduction in taxes, only 52 percent (1-.48) of the pre-tax cost of debt remains. For example, if "A" bonds pay 9.03 percent interest before tax, to determine a firm's true, after tax cost, one would multiply 9.03 by .52 to get a 4.7 percent debt cost.

Finding The Cost of Equity

Obtaining an exact cost of equity figure is difficult: financial theorists do not agree entirely on the best method of measuring it, and the effort to apply any measure to individual regulatees can very easily become a dark and deep quagmire if the issue is litigated. Consequently, the Department will use a very simple but well established approach.* Tnis approach applies two simple rules of thumb:

* During periods of economic stability, investors expect an equity yield of from 2-4 percent above the cost of debt in order to compensate them for the added risk entailed in owning equity. Given

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* See, e.g., Weston and Brigham's Managerial Finance.

the 9.03 percent example cost of debt, this would suggest a cost of equity in the range of 11.03 - 13.03 percent. For ease of calculation, we will use a simple rule: in periods when inflation is less than 6 percent per year, the cost of equity will be calculated as 3 percent above the then-current cost of debt.

- During periods of economic uncertainty, when pessimism is deep, interest rates high, and financial markets unstable, investors typically expect a 15 percent rate of return. For ease of calculation (and to err, if at all, on the conservative side) we will use a simple rule: in periods of high economic instability (as now -- high inflation, low stock market) the cost of equity will be calculated as 14.5 percent.

Calculating A Weighted Cost of Capital

To arrive at a weighted cost of capital, it is necessary only to multiply the cost of equity and of debt by their respective percentages of the industry's (or regulatee's) capital structure. Thus:

$$\left(\begin{matrix}\text{Percentage}\\ \text{of Debt}\end{matrix}\right)\left(\begin{matrix}\text{Cost of}\\ \text{Debt}\end{matrix}\right)\left(\begin{matrix}\text{Percentage}\\ \text{of Equity}\end{matrix}\right)\left(\begin{matrix}\text{Cost of}\\ \text{Equity}\end{matrix}\right) = \text{COST OF CAPITAL}$$

In our example, this works out as follows:

$$(.30)\ (4.7) + (.70)\ (14.5) = 11.57\% = \text{COST OF CAPITAL}$$

The above calculations should be repeated for each industry listed in the cost of capital table. A sample worksheet, including the example carried through in the above sections follows. Similar worksheets should be used for each calculation.

WORKSHEET FOR CALCULATING
AN INDUSTRY WIDE COST OF CAPITAL

INDUSTRY: Stone, Clay & Glass Products

SIC Code: 32

		Percent of Total Capitalization
DEBT:*	4833	30
EQUITY:*	11064	70
TOTAL:	15897	100

COST OF DEBT: 9.08% X .52 = 4.72%

COST OF EQUITY: 14.5%

COST OF CAPITAL: (%Debt) x (Cost of Debt) + (%Equity) X (Cost of Equity)

.30 x 4.7% + .70 x 14.5%

COST OF CAPITAL = 11.57%

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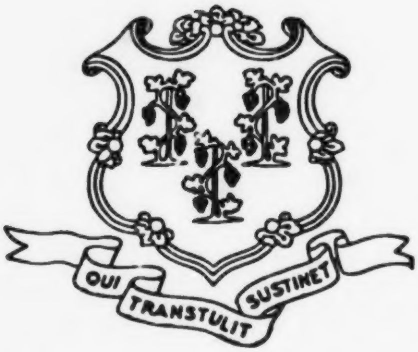
* Source: Federal Trade Commission: *Quarterly Financial Report.*

V-135

State of Connecticut
THOMAS J. MESKILL
Governor



CONNECTICUT MANUFACTURING DIRECTORY
1973

Connecticut Labor Department
200 Folly Brook Boulevard
Wethersfield, Connecticut 06109

JACK A. FUSARI
Labor Commissioner

THOMAS J. HAGUE
Deputy Commissioner

Five Dollars Per Copy

SAMPLE ENTRIES FROM THE CONNECTICUT MANUFACTURING DIRECTORY:

159

(a) Tiny Features, Inc.
837 Farmington Ave., Hartford 06105
Children's tabloid 27
(a) Tipping Industries, Inc.
75 Schoolground Rd., Branford 06405
Water purifiers 35
(a) Titan Tool Co.
113 Jetland St., Bridgeport 06605
Plastic mold dies 35
(a) Titan Tool & Die Co., Inc.
3 Marshall St., Wallingford 06492
Tools; dies; gages; stampings 35
(a) To-Le Machine Shop
362 New Haven Ave., Milford 06460
Machine shop 35
(a) Tober, A. W., Co.
25 No. Parade St., Stratford 06497
Commercial printing 27
(c) Todd-C. E. A., Inc.
Subsidiary of Combustion Equipment Associates
61 Taylor Reed Pl , Stamford 06902
Pollution control systems 34
(a) Tolland Fabrics, Inc.
8 School St., Stafford Springs 06076
Upholstery, drapery fabrics 22
(a) Tolland Machine Co.
Rt. 30, Rockville 06066
Machine shop 35
(b) Tollman Spring Co., Inc.
Ronzo Rd., Bristol 06010
Springs; wire forms 34
(b) Tomasso, Angelo, Inc.
Warren St., New Britain 06052
Rt. 6, Farmington 06032
South St., Portland 06480
Bituminous concrete 29
(b) Tomasso of North Haven, Inc.
Sackett Rd., No. Haven 06473
Asphalt paving materials 29
(b) Tomco Mfg. Co.
46 Manila Ave., Hamden 06514
Milling; tapping; drilling 35
(a) Tomlin Woodworking Co., Inc.
Rt. 6, Andover 06232
Cabinets, planing rough lumber 24
(b) Tomlinson, W. F., Co.
336 Main St., Danbury 06810
Concrete burial vaults 32
(a) Tommy's Welding Service
236 Hope St., Glenbrook 06906
Welding shop 35
(a) Tompson-Malone, Inc.
999 Sherman Ave., Hamden 06514
Publishing books 27
(a) Tom's Ornamental Iron Works
Rt. 7, Brookfield 06804
Iron railings 34
(a) Toni Mfg. Co., Inc.
153 East St., New Haven 06513
Ladies' swimwear 23
(a) Toni & Sons Ravioli Mfg. Co., Inc.
55 Spring St., New Haven 06519
Spaghetti products 20
(a) Toni's Bakery
439 Wolcott Rd., Wolcott 06716
Bakery products 20
(a) Tool Research, Inc.
1261 Stratford Ave., Stratford 06497
Tools 35
(b) Toolcraft Engineering, Inc.
3812 E. Main St., Waterbury 06705
Tools, dies 35
(a) Toolcraft, Inc.
18 Liberty St., Stamford 06902
Dies, jigs, precision parts 35
(a) Tooling Technology, Inc.
464 Pratt St., Meriden 06050
Jigs, fixtures 35
(a) Toolmakers, Inc.
15 Larsen St., So. Norwalk 06854
Machine shop 35
(a) Tools & Components, Inc.
Old New Hartford Rd , Barkhamsted 06098
Tools; dies; jigs; fixtures 35
(b) Topaz Handbags Ltd.
73 Daggett St., New Haven 06519
Leather handbags 31
(b) Tops Photo Engraving Corp.
1 Division St., Derby 06418
Photoengravings 27
(a) Topskill Mfg. Co., Inc.
52 John St., E. Hartford 06108
Machine shop 35
(a) Topstone Industries, Inc.
2 Augusta Dr., Danbury 06810
Children's toy make-up kits 39
(b) Topstone Rubber Toys Co., Inc.
2 Augusta Dr., Danbury 06810
Rubber, plastic masks; rubber squeeze toys 30
(e) Torin Corp.
Air Moving Div.
Still River Plant
Winsted Rd., Torrington 06790
Blower wheels; industrial blowers; fans 35
Machine Div.
Kennedy Dr., Torrington 06790
Wire forming machinery 35
B. & B. Plastics Div.
100 Franklin Ave., Torrington 06790
Plastic electrical switch buttons 30
(a) Torino Baking Co.
43 Centennial Ave., Meriden 06450
Bakery products 20
(a) Toroid-Trans Electronics Co., Inc.
Lake Ave. Exit, Danbury 06810
Coil winding; electrical assemblies;
bobbins 36
(a) Toroidal Specialties, Inc.
87 Dodgingtown Rd., Bethel 06801
Toroidal coil winding 36
(a) Torrey Bros. Co.
Central Village, Plainfield 06374
Wooden mixing paddles, stable forks 24
(a) Torrington Brush Works, Inc.
63 Avenue A, Torrington 06790
Industrial brushes 39
(b) Torrington Casting Co., Inc.
293 New Litchfield St., Torrington 06790
Plumbing, electrical castings 34
(a) Torrington Chemical & Supply Co.
Rt. 116 & Hill Rd., Harwinton 06790
Industrial detergents 28
(f) Torrington Co.
Standard Plant
59 Field St., Torrington 06790
Needle bearings; cycle spokes, nipples,
pedals, handle bars; specialty metal
wire products 35

MAJOR INDUSTRY CLASSIFICATIONS USED IN DIRECTORY

Based on the 1967 Standard Industrial Classification Manual

MANUFACTURING INDUSTRIES IN SECTION II OF DIRECTORY

MAJOR INDUSTRY 19—ORDNANCE

Establishments engaged in manufacturing artillery, small arms and related equipment, ammunition, tanks and specialized tank parts, sighting and fire control equipment, and miscellaneous ordnance and accessories.

MAJOR INDUSTRY 20—FOOD

Manufacturing foods and beverages for human consumption and related products, such as manufactured ice, vegetable and animal fats and oils, and prepared feeds for animals and fowls.

MAJOR INDUSTRY 21—TOBACCO

This major group includes firms engaged in manufacturing cigarettes, cigars and stemming and redrying tobacco.

MAJOR INDUSTRY 22—TEXTILES

Establishments engaged in any of the following operations: (1) preparation of fiber and subsequent manufacturing of yarn, thread, braids, twine and cordage, (2) broad woven fabric, narrow woven fabric, knit fabric and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabric and knit apparel; (4) coating, waterproofing or otherwise treating fabrics; (5) the integrated manufacture of knit apparel and other finished articles from yarn, and (6) felt and lace goods, bonded-fiber fabrics and miscellaneous textiles.

MAJOR INDUSTRY 23—APPAREL

Manufacturers of clothing and fabricating products by cutting and sewing purchased woven or knit textile fabrics and related materials such as leather, rubberized fabrics, plastics and furs. Also included are (1) the "regular" or inside factories, (2) contract factories, and (3) apparel jobbers. Regular factories perform all of the usual manufacturing functions in their own plant; contract factories manufacture apparel from materials owned by others and apparel jobbers perform such functions as buying raw materials, designing and preparing samples, arranging for the manufacture of garments from their materials and selling the finished apparel.

MAJOR INDUSTRY 24—LUMBER AND WOOD

This group includes logging camps engaged in cutting timber and pulpwood, merchant sawmills, lath, shingle, cooperage stock, planing and plywood mills and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made of wood or wood substitutes.

MAJOR INDUSTRY 25—FURNITURE AND FIXTURES

Manufacturers of household, office, public building and restaurant furniture, and office and store fixtures.

MAJOR INDUSTRY 26—PAPER

The manufacture of pulps from wood and other cellulose fibers and rags; paper and paperboard, and the manufacture of paper and paperboard into converted products such as paper coated off the paper machine, paper bags, boxes and envelopes.

MAJOR INDUSTRY 27—PRINTING AND PUBLISHING

Establishments engaged in printing by one or more of the common processes, such as letterpress, lithography, gravure, or screen; firms performing services for the printing trade such as bookbinding, typesetting, engraving, photoengraving and electrotyping and establishments engaged in publishing newspapers, books and periodicals, regardless of whether or not they do their own printing.

MAJOR INDUSTRY 28—CHEMICALS

This major group includes establishments producing basic chemicals and others manufacturing products by predominantly chemical processes. Products manufactured by these firms are in three general classes: (1) basic chemicals such as acids, alkalies, salts and organic chemicals, (2) chemical products to be used in further manufacture such as synthetic fibers, plastic materials, dry colors and pigments, and (3) finished chemical products to be used for ultimate consumption such as drugs, cosmetics and soaps or to be used as materials or supplies in other industries such as paints, fertilizers and explosives.

MAJOR GROUP 29—PRODUCTS OF PETROLEUM AND COAL

This major group includes establishments primarily engaged in manufacturing paving and roofing materials and compounding lubricating oils and greases from purchased materials.

MAJOR INDUSTRY 30—RUBBER AND PLASTICS

Manufacturing from natural, synthetic or reclaimed rubber products such as tires, rubber footwear, mechanical rubber goods, heels and soles, flooring and rubber sundries. This group also includes establishments manufacturing tires. Automobile tire repair shops engaged in recapping and retreading automobile tires are classified in Section III, Auto Repair Shops. This group also includes establishments engaged in molding primary plastics for the trade and manufacturing miscellaneous finished plastic products.

MAJOR INDUSTRY 31—LEATHER

Tanning, currying and finishing hides and skins and establishments manufacturing finished leather and artificial leather products and similar products made of other materials. Leather convertors are also included.

MAJOR INDUSTRY 32—STONE, CLAY, GLASS AND CONCRETE PRODUCTS

This major group includes establishments engaged in manufacturing flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone, abrasive and asbestos products, etc., from materials taken principally from the earth in the form of stone, clay and sand.

MAJOR INDUSTRY 33—PRIMARY METAL INDUSTRIES

Smelting and refining of ferrous and nonferrous metals from ore, pig or scrap, rolling, drawing and alloying of ferrous and nonferrous metals; castings, forgings and other basic products of ferrous and nonferrous metals and the manufacture of nails, spikes and insulated wire and cable. This major group also includes the production of coke.

MAJOR INDUSTRY 34—FABRICATED METAL PRODUCTS

Fabricating ferrous and nonferrous metal products such as metal cans, tinware, hand tools, cutlery, general hardware, non-electric heating apparatus, fabricated structural metal products, metal stampings and a variety of metal and wire products not classified elsewhere.

MAJOR INDUSTRY 35—MACHINERY

Establishments engaged in manufacturing machinery and equipment other than electrical equipment (Major Industry 36) and transportation equipment (Major Industry 37). Machines powered by built-in or detachable motors ordinarily are included in this major group, with the exception of electrical household appliances (Major Industry 36). Portable tools, both electric and pneumatic powered, are included in this major group but hand tools are classified in Major Industry 34.

MAJOR INDUSTRY 36—ELECTRICAL EQUIPMENT

This major group includes establishments engaged in manufacturing machinery, apparatus and supplies for the generation, storage, transmission, transformation and utilization of electrical energy. The manufacture of household appliances is included in this group, but industrial machinery and equipment powered by built-in or detachable electric motors are classified in Major Industry 35.

MAJOR INDUSTRY 37—TRANSPORTATION EQUIPMENT

Manufacturing of equipment for transportation of passengers and cargo by land, air and water. Products include motor vehicles, aircraft, ships, boats, railroad equipment and miscellaneous transportation equipment such as motorcycles, bicycles, trailers and mobile homes.

MAJOR INDUSTRY 38—PROFESSIONAL, SCIENTIFIC AND CONTROLLING INSTRUMENTS; PHOTOGRAPHIC AND OPTICAL GOODS; WATCHES AND CLOCKS

Establishments engaged in manufacturing mechanical measuring, engineering, laboratory and scientific research instruments; optical instruments and lenses, surgical, medical and dental instruments, equipment and supplies; ophthalmic goods; photographic equipment and supplies, and watches and clocks.

MAJOR INDUSTRY 39—MISCELLANEOUS MANUFACTURING INDUSTRIES

This major group includes establishments primarily engaged in manufacturing products not classified in any other manufacturing group. Industries in this group fall into the following categories: jewelry, silverware and plated ware, musical instruments, toys, sporting and athletic goods, pens, pencils and other office and artists' materials, buttons, costume novelties, miscellaneous notions, brooms and brushes, morticians' goods and other miscellaneous manufacturing industries.

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Quarterly Financial Report

for manufacturing corporations

SECOND QUARTER
1974

FEDERAL TRADE COMMISSION

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1/ Each lettered table includes, in successive order, an income statement, balance sheet and ratio formatted balance sheet.

TABLE D-2 BALANCE SHEET FOR

ESIC INDUSTRIES

(Million

	Stone, Clay and Glass Products		
	4Q 1973	1Q 1974	2Q 1974
ASSETS			
Cash and demand deposits in the U.S.	642	424	396
Time deposits in the U.S., including negotiable certificates of deposit	217	256	197
Deposits outside the U.S.	3	3	9
Cash on hand and in banks	862	683	602
U. S. Treasury securities (i) Subject to agreements to sell	12	0	2
U. S. Treasury securities (ii) Other, due in 1 year or less	44	45	36
U. S. Treasury securities (iii) Other, due in more than 1 year	12	9	4
Federal agency securities (i) Subject to agreements to sell	0	1	0
Federal agency securities (ii) Other, due in 1 year or less	17	7	2
Federal agency securities (iii) Other, due in more than 1 year	1	0	4
Commercial and finance company paper of U.S. issuers	237	122	69
State and local government securities due in 1 year or less	44	59	33
Foreign securities due in 1 year or less	7	8	2
Other short-term financial investments including bankers' acceptances	38	31	20
Total cash, U.S. Government and other securities	1,275	965	775
Trade receivables from U.S. Government	4	9	35
Other trade accounts and trade notes receivable (less allowances for doubtful receivables)	3,248	3,433	3,730
Total receivables	3,252	3,442	3,765
Inventories	2,950	3,302	3,510
Current assets not elsewhere specified	540	594	523
Total current assets	8,017	8,302	8,572
Depreciable and amortizable fixed assets, including construction in progress	16,640	16,974	16,924
Land and mineral rights	738	805	879
Deduct: Accumulated depreciation, depletion, and amortization	8,422	8,543	8,531
Net property, plant, and equipment	8,956	9,236	9,273
Non-current assets not elsewhere specified, including investment in non-consolidated entities, other long-term investments, intangibles, etc.	2,127	2,189	2,181
Total assets	19,101	19,727	20,026
LIABILITIES AND STOCKHOLDERS' EQUITY			
Short-term loans (original maturity of 1 year or less) a. Loans from banks	469	542	686
Short-term loans (original maturity of 1 year or less) b. Commercial paper	197	153	181
Short-term loans (original maturity of 1 year or less) c. Other short-term loans	39	52	58
Advances and prepayments by U.S. Government	0	0	1
Trade accounts and trade notes payable	1,314	1,281	1,402
Income taxes accrued, prior and current years, net of payments a. Federal	311	328	277
Income taxes accrued, prior and current years, net of payments b. Other	45	51	45
Installments, due in 1 year or less, on long-term debt a. Loans from banks	162	149	144
Installments, due in 1 year or less, on long-term debt b. Other long-term debt	227	214	274
Current liabilities not elsewhere specified, including excise and sales taxes, and accrued expenses	916	1,058	1,122
Total current liabilities	3,681	3,829	4,190
Long-term debt due in more than 1 year a. Loans from banks	816	932	913
Long-term debt due in more than 1 year b. Other long-term debt	2,763	2,951	3,040
Non-current liabilities not elsewhere specified, including deferred income taxes	842	915	916
Minority stockholders' interest in consolidated domestic corporations	46	35	36
Total liabilities	8,148	8,663	9,094
Capital stock and other capital	3,362	3,441	3,419
Retained earnings	7,863	7,902	7,806
Deduct: Treasury stock, at cost	272	279	292
Stockholders' equity	10,953	11,064	10,932
Total liabilities and stockholders' equity	19,101	19,727	20,026
NET WORKING CAPITAL			
Excess of current assets over current liabilities	4,336	4,473	4,382

1/ Included in Primary Metal Industries.

Financial DYNAMICS

–INDUSTRIALS–

ANNUAL FINANCIAL ANALYSIS

BUILDING MTRLS-CEMENT
AMCORD INC

	TOTAL DOLLARS -000,000-	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
	LANCE SHEET										
56	Cash & Equivalent	7	5	8	7	4	7	8	8	8	2
57	*Compensating Balances*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
58	Receivables	9	7	13	16	24	21	20	20	18	16
59	Inventories	10	9	13	22	28	27	29	29	31	51
60	Other Current Assets	1	1	1	5	5	5	6	4	3	3
61	Total Current Assets	26	23	34	50	61	60	63	61	60	72
62	Investments & Advances	4	5	12	28	34	34	23	22	18	12
63	Other Assets	5	4	4	4	11	4	5	3	2	2
64	Net Plant	86	82	81	118	110	115	126	118	119	127
65	Intangibles	0	0	0	2	2	2	2	1	1	6
66	Total Assets (Liabilities & Net Worth)	120	117	132	202	217	215	218	205	199	219
67	Current Liabilities	18	15	21	35	54	48	50	43	43	53
68	Other Liabilities	1	1	1	2	2	3	2	2	2	2
69	Long-Term Debt	22	22	20	66	72	75	76	71	65	70
70	Minority Interest	0	0	0	1	1	1	3	0	0	0
71	Preferred Stock	11	10	20	20	20	19	19	19	18	18
72	Deferred Taxes & Investment Credit	8	8	10	11	8	8	8	8	8	9
73	Common Equity (Book Value)	60	61	59	66	60	61	61	62	63	67
74	Total Invested Capital	101	101	109	165	160	165	166	160	154	164
75	Working Capital	8	8	13	15	6	12	12	18	17	19
76	Current Ratio	1.4	1.6	1.6	1.4	1.1	1.2	1.2	1.4	1.4	1.4
	ESTED CAPITAL										
	AS % OF TOTAL INVESTED CAPITAL										
77	Long-Term Debt	22	22	19	40	45	46	46	45	42	43
78	Minority Interest	0	0	0	1	1	1	2	0	0	0
79	Preferred Stock	10	10	15	12	12	12	11	12	12	11
80	Deferred Taxes & Investment Credit	8	8	9	7	5	5	5	5	5	5
81	Common Equity (Book Value)	59	60	54	40	37	37	37	39	41	41
	RKET DATA										
	PER SHARE DATA										
32	Price-High	12	12	16	24	20	13	10	9	7	5
33	Price-Low	10	8	8	13	9	6	5	6	4	3
34	Price-Close	10	8	16	19	10	7	6	6	4	3
15	Earns P/S Prim (Excl Ex It Dis Op)	1.04	0.80	1.20	1.16	0.55	0.55	0.31	0.57	0.75	0.92
16	P-E Ratio Range	12- 9	15- 9	14- 6	21-11	35-17	24-11	31-17	15-11	9- 5	5- 3
17	Year-End Close P-E	10	10	14	16	18	13	21	11	6	3
18	High P-E as % Low P-E Ratio	127	160	218	183	210	221	181	146	168	190
19	Cash Flow Per Share	2.40	2.34	2.58	2.52	0.54	1.69	1.54	1.83	1.97	1.99
10	Price-Cash Flow Ratio Range	5- 4	5- 3	6- 3	10- 5	36-17	8- 4	6- 3	5- 3	3- 2	3- 1
11	Year-End Close Price-Cash Flow	4	3	6	7	18	4	4	3	2	2
12	Dividends Per Share Paid	0.53	0.55	0.55	0.55	0.55	0.28	0.00	0.00	0.20	0.23
13	*Dividends as % Available for Common*	51%	70%	40%	46%	98%	50%	0%	0%	0%	24%
14	*Dividends as % Cash Flow*	22%	24%	19%	21%	101%	15%	0%	0%	0%	10%
5	Dividend Yield-High	5.7	7.6	7.4	4.2	5.9	0.0	0.0	0.0	5.2	9.1
6	Dividend Yield-Low	4.5	4.6	3.4	2.3	2.8	0.0	0.0	0.0	3.1	4.8
7	Dividend Yield-Close	5.3	7.3	3.4	2.9	5.7	0.0	0.0	0.0	4.7	8.0
	INDUSTRY RELATIVES										
	AS % OF S&P INDEXES										
8	Year-End Close Price	34	36	55	41	29	19	16	18	18	NA
9	Earns P/S Primary (Ex Ex It Dis Op)	39	40	68	49	21	34	12	19	19	NA
0	P-E Ratio-High	77	96	73	102	207	102	169	108	98	NA
1	P-E Ratio-Low	87	91	52	97	137	66	131	95	95	NA
2	Year-End Close P-E Ratio	87	90	82	84	142	57	134	95	91	NA
3	% Return on Avg Common Equity	122	111	220	171	77	127	43	68	70	NA
4	Year-End Close Yield	100	111	74	97	144	0	0	0	81	NA
	425 RELATIVES										
	Year-End Close Price	11	9	16	17	10	7	6	5	4	4
5	Earns P/S Primary (Ex Ex It Dis Op)	19	14	21	19	9	10	9	8	8	NA
7	P-E Ratio-High	66	88	72	108	107	125	161	79	56	NA
8	P-E Ratio-Low	60	72	43	74	108	79	105	65	65	NA
9	Year-End Close P-E Ratio	56	66	74	89	106	71	111	55	46	NA
0	Return on Avg Common Equity	63	44	84	85	46	54	27	46	48	NA
1	Year-End Close Yield	153	107	108	96	165	0	0	0	130	153

	TOTAL DOLLARS -000,000-	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
	STATEMENT OF FIN COND										
112	Net Inc (Incl Ex It/Dis Op)	5.8	4.2	6.9	7.4	-4.0	4.3	2.8	4.6	5.4	6.3
113	Depreciation & Amort	6.8	6.7	7.0	7.8	8.1	8.0	7.4	7.5	7.2	7.4
114	Deferred Income Taxes	1.0	0.8	1.4	2.4	-7.4	NA	NA	NA	NA	-0.7
115	Chg in LTD & Pfd	-2.0	-0.8	8.7	45.3	5.7	2.8	0.0	-4.8	-7.3	5.4
116	Chg in Common Stock	NA	NA	NA	NA	NA	NA	NA	NA	-2.2	0.2
117	Sale of Prop, Plant & Equip	NA	NA	NA	NA	NA	NA	NA	NA	1.0	2.4
118	Pfd Dividends	0.7	0.6	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.0
119	Common Dividends	2.6	2.4	2.4	3.1	3.3	1.7	0.0	0.0	0.0	1.3
120	Capital Expenditures	5.4	3.3	3.3	7.0	3.2	30.3	14.1	11.8	8.9	17.5
121	Chg in Investments	NA	NA	NA	NA	NA	NA	NA	NA	-1.4	-6.5
122	Chg in Working Capital	-0.2	0.7	5.1	1.5	-8.6	5.7	0.5	5.7	-1.5	2.5
123	Total Sources & Uses	NA	NA	NA	NA	NA	NA	NA	NA	21.8	37.4
	DEBT ANALYSIS										
124	Notes Payable	NA	NA	NA	NA	NA	16.3	22.9	12.5	8.5	10.6
125	Current Portion LTD	NA	NA	NA	NA	NA	7.3	5.4	7.3	6.4	8.2
126	LTD	22.4	21.9	20.5	66.1	72.1	75.2	75.8	71.3	64.6	70.3
127	Pres Value Lease Oblig	NA	NA	NA	NA	NA	NA	NA	NA	NM	NA
128	Unfd Pens Lia-Vest Ben	NA	NA	NA	NA	NA	NA	NA	NA	5.0	7.0
129	*Unfd Pens Lia-PSC*	NA	NA	NA	NA	NA	NA	NA	NA	10.0	9.7
130	Total Adjusted Debt	22.4	21.9	20.5	66.1	72.1	98.8	103.8	91.1	84.5	96.0
131	% LTD Tied to Prime	NA	NA	NA	NA	NA	NA	NA	NA	23.2	22.6
132	LTD Maturing-5 Years	NA	NA	NA	NA	NA	NA	NA	NA	35.1	43.4
133	STD as % LTD & STD	5.9	6.0	18.7	13.4	26.3	23.9	26.9	21.7	18.8	21.1
134	Interest Coverage	6.6	5.3	8.8	6.4	2.4	2.3	2.2	2.4	2.5	1.9
135	Total Fixed Chg Coverage	4.0	3.2	8.7	4.1	1.9	1.0	1.9	1.8	1.9	1.7
	ASSETS										
136	Y-E Gross Assets ($ Mil)	184	185	207	282	305	311	315	303	299	319
137	Y-E Gr Opr Assets ($ Mil)	174	173	190	246	255	267	281	274	276	302
138	P/T Ret-Avg Gr Opr Assets	4.1%	3.1%	5.3%	5.3%	2.4%	2.8%	1.8%	3.5%	4.3%	5.3%
139	P/T Ret-Avg Gr Assets	4.7%	3.4%	5.7%	5.6%	3.2%	3.6%	2.7%	4.1%	4.8%	5.6%
140	A/T Ret-Avg Gr Assets	3.2%	2.2%	3.5%	3.0%	1.4%	1.4%	0.9%	1.4%	1.8%	2.0%
	INVESTED CAPITAL										
141	Y-E Invested Capital P/S	23.03	23.09	21.44	28.29	26.53	27.26	27.49	26.27	27.16	28.80
142	Sales Per $ Avg Inv Cap	0.64	0.67	1.00	0.93	0.84	0.82	0.80	0.91	1.02	1.12
143	P/T Ret on Avg Inv Cap	8.1%	6.2%	10.6%	10.0%	5.7%	6.8%	5.1%	7.8%	9.2%	10.9%
144	A/T Ret on Avg Inv Cap	6.6%	5.0%	7.4%	6.4%	4.5%	4.7%	3.2%	4.7%	5.8%	8.2%
	COMMON EQUITY										
145	Y-E Common Eqty P/S	13.66	13.93	11.51	11.37	9.87	10.15	10.13	10.25	11.16	11.84
146	P/T Ret-Avg Com Eqty	10.2%	7.1%	14.7%	16.7%	6.8%	8.2%	4.7%	9.2%	11.1%	10.8%
147	A/T Ret-Avg Com Eqty	8.3%	5.8%	10.2%	10.7%	5.3%	5.6%	3.0%	5.9%	7.0%	8.2%
148	Prc to Com Eqty P/S-High	90.6%	86.3%	143%	212%	199%	131%	94.7%	89.6%	58.3%	42.2%
149	Prc to Com Eqty P/S-Low	71.1%	53.9%	65.3%	116%	94.8%	59.2%	52.2%	58.5%	34.7%	22.2%
150	Intern Grth Rate Avg C E	4.1%	1.8%	6.1%	5.7%	-13%	2.8%	3.0%	5.7%	7.0%	6.2%
	GROSS PLANT										
151	Y-E Gr Plant ($ Mil)	149	150	157	199	198	211	222	215	218	227
152	Net Plant as % Gr Plant	57.5%	54.8%	51.8%	59.5%	55.5%	54.6%	56.6%	54.7%	54.4%	55.9%
153	Sales Per $ Avg Gr Plant	0.45	0.45	0.68	0.71	0.69	0.65	0.61	0.68	0.74	0.80
154	Depr Amort as % Avg Gr Pl	4.6%	4.5%	4.6%	4.4%	4.1%	3.9%	3.4%	3.4%	3.3%	3.3%
155	Cap Expend as % Avg Gr Pl	3.7%	2.2%	2.2%	3.9%	1.6%	14.8%	6.5%	5.4%	4.1%	7.9%
	SALES										
156	Sales Per $ Avg Receivables	8.80	8.39	10.19	8.85	6.95	6.01	6.42	7.37	8.34	10.35
157	Sales Per $ Avg Inventory	6.98	7.14	9.52	7.23	5.44	4.90	4.74	5.12	5.34	4.38
158	Sales Per $ Avg Work Cap	8.57	8.49	9.65	8.96	12.97	14.92	10.93	9.81	9.28	10.05
159	Incr $ Sales Per Incr $ WC	NM	2.14	7.27	15.07	NM	-0.45	-4.10	2.98	NM	7.29
	MARKETABILITY										
160	Mkt Val Shrs O/S ($ Mil)	46	33	84	110	59	44	38	37	24	17
161	Mkt Val Shrs Trd ($ Mil)	7	3	26	51	21	12	10	8	3	2
162	Shrs Trd as % Shrs O/S	16.0	10.1	31.5	46.2	35.7	26.4	26.6	21.8	12.9	10.2
163	No of Shrs O/S (Mil)	4.4	4.4	5.1	5.8	6.0	6.0	6.0	6.1	5.7	5.7
164	Shrs Used in Calc EPS (Mil)	4.9	4.4	5.1	5.8	6.0	6.7	6.0	6.0	5.9	6.4

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1974
VOL. 1
A–I

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Plants and Properties: Company and subsidiaries operate a total of 41 plants having combined floor space of about 5,000,000 square feet. Plants are located Meriden, Wallingford, Bridgeport, Conn., Chicago, Ill., Phoenix, Ariz., Birmingham, Ala., Royal Oak, Mich., Tipton, Butler, Muncie, Lafayette, Ind., Conshohocken, Wilkes-Barre, Pa., Hayesville, Robbinsville, N. C., Yonkers, Port Washington, Mt. Vernon, Buffalo, N. Y., Dallas, San Angelo, El Paso, Texas, Covina, Canoga Park, Los Angeles, Calif., Hollywood, City, Fla., Paterson, N. J., Louisville, Ky., St. Louis, Mo., Old Hickory, Tenn., Minneapolis, Minn., Barrie, Ontario, Holyoke, Mass., Chatham, Va. and Taiwan.

Company also operates 29 retail stores for distribution of its coating and chemical products in major cities in Iowa, Wisconsin, Missouri, California and Hawaii.

Subsidiaries

Times Wire & Cable Co. (wholly-owned) manufactures coaxial cable for community antenna television and engineered wire and cable and connectors for specialized electronic applications. Plants located in Wallingford, Conn. and Phoenix, Ariz.

W. H. Hutchinson & Son, Inc. (wholly-owned). Principal product is bottle caps. Also does commercial decorating for manufacturers of various types of containers, toys and other lithographed items. Plants at Chicago, Ill. and Birmingham, Ala.

MRM Industries (wholly owned) producer of semi-fabricated and finished nonferrous mill products. Massasoit Trading Company (wholly owned by MRM Industries) manufactures components used in the process of upholstering furniture.

Steel Parts Corp. (wholly-owned). Manufactures bushings, door hinges, clutch plates for automotives industry. Plant at Tipton, Ind.

Peerless Wire Goods Co., Inc., Lafayette, Ind. (wholly owned) manufactures wire-coated racks for dish washers, etc.

Hawthorne Metal Products Co. (wholly-owned) manufactures large metal stampings for automotive industry. Plant located at Royal Oak, Mich.

Taylor Publishing Co. (wholly-owned) world's largest manufacturer of high school and college yearbooks. Plants at Dallas and San Angelo, Tex., Covina, Cal., El Paso, Tex. and Juarez, Mexico.

International Graphics, Inc. (wholly-owned by Taylor Publishing) prints postcards, brochures, financial publications. Plant in Hollywood, Fla.

Roth Greeting Cards, Inc. (wholly-owned by Taylor Publishing) produces greeting cards and personalized stationery. Plant in Canoga Park, Cal.

Stewart Stamping Corp. (wholly-owned). Manufactures stamped metal and wire-formed products for electronic and electrical industries. Plant at Yonkers, N. Y.

American Components Inc. (wholly-owned). Manufactures thin film resistors and chip capacitators. Plants at Conshohocken, Pa. and Hayesville, N. C.

World Tableware Corp. (wholly owned). Owns controlling interest in International Tableware Industrial Corp. (Taiwan sub.) which manufactures stainless steel flatware in Taiwan.

Enterprise Paint Mfg. Co. (Div. of Insilco Corp.) makes paints, varnishes and related products for consumer use. Also hobby-crafts and industrial maintenance and cleaning chemicals. Plants in Chicago and Wheeling, Ill.

Sinclair Paint Co. (Div. of Insilco Corp.) manufactures paint and also sells wall coverings. Plant in Los Angeles, Calif.

Red Devil Paints, Inc. (Div. of Insilco Corp.) manufactures paint. Plant in Mt. Vernon, N. Y.

McDonald Products Corp. (wholly owned) manufactures office and desk top accessories. Plant in Buffalo, N. Y.

Frisch & Co. (Div. of Insilco Corp.) manufactures paints. Plant is in Paterson, N. J.

Zephyr American Corp. (wholly-owned) makes desktop rotary card files, index systems and other office devices. Plant located in Moca, P. R.

Miles Homes Co. provides an individual with the plans, materials and guidance to build his own home. Plants located in Minneapolis, Minn., Wilkes-Barre, Pa. and Butler, Ind.

Tobey Color Cards Co. engaged in distribution of color cards, color books and fabric carpet.

Connoisseur Studios Inc. manufactures hobby crafts in plant located in Louisville, Ky.

A & B Tool Co. manufactures tools in plant in Old Hickory, Tenn.

Joint Venture: In Nov. 1972 Times Wire and Cable Co., subsidiary, completed negotiations with a Belgian wire and cable producer, LaSeneffoise S.A., to form a joint venture organization to manufacture and distribute CATV cable in Belgium and other countries of the European Common Market called LaSeneffoise-Times S.A. Ownership is divided equally between Times and LaSeneffoise. Co. has 20,000-sq. ft. plant in Seneffe, South of Brussels.

Officers:
D. B. Bietz, Pres. and Chief Exec. Officer
J. B. Stevens, Exec. Vice-President
L. J. DeGeorge, Exec. Vice-President
J. D. Shaw, Vice-President
J. W. Taylor, Jr., Vice-President
H. E. Bortle, Vice-President
M. Q. Fiterman, Vice-President
W. H. Lynch, Vice-President
H. W. Bertine, Vice-Pres. & Gen. Cnsl. & Sec.
D. J. Harper, Vice-President
A. R. Wolff, Vice-President
R. E. Pursley, Vice-Pres.
W. E. Baer, Controller
C. E. Peterson, Jr., Vice-Pres. (Fin.)
W. J. Amberg, Treas.

Directors:
J. W. Field, Fairfield, Conn.
J. D. Shaw, Meriden, Conn.
J. B. Stevens, Wallingford, Conn.
D. E. Noble, Wooster, Ohio
C. C. Davis, New York
M. Q. Fiterman, Minneapolis, Minn.
D. B. Bietz, Wallingford, Conn.
F. J. Manheim, New York, N. Y.
J. R. Tomlinson, Danbury, Conn.
J. W. Taylor, Jr., Dallas, Tex.
C. E. Lord, Hartford, Conn.
L. J. DeGeorge, Cheshire, Conn.
W. G. Dillon, New York
J. W. Taylor
A. R. Wolff, Winnetka, Ill.

Auditors: Price Waterhouse & Co.

Annual Meeting: Last Wednesday in April.

No. of Stockholders: Feb. 22, 1974, Series A preferred, 1,344; 8% preferred, 328; common, 18,952.

No. of Employees: Dec. 31, 1973, 9,373.

Main Office: 1000 Research Pkway., Meriden, Conn. 06450.

Consolidated Income Account, years ended Dec. 31 (000 omitted):

	1973	⑥1972	1971
Net sales	366,700	338,315	287,593
Other inc	4,936	3,006	1,029
Total	371,636	341,321	288,622
Cost of sales	245,878	227,502	190,602
Sell, etc., exp	76,357	72,388	61,400
Deprec	8,013	7,628	7,396
Interest	11,420	7,970	7,283
③Inc taxes	15,012	12,500	10,833
Extraord chg	......	④1,300	④200
Net income	14,939	12,944	10,600
Prev ret earn	49,312	43,494	42,330
8% pfd divs	75	75	76
2nd pfd divs	948	948	948
Com divs (cash)	6,269	6,416	6,275
Pfd stk retired	......	8	......
Pool int adj	......	dr94	dr178
②Debit	......	②562	700
Retain earn	①57,121	49,312	43,494
⑤Earn, com sh	$1.31	⑦$1.18	⑦$1.03
Yr end shs	9,997,327	9,339,780	9,339,268

①$24,226,000 not restricted. ②Chgs relating to issuance of com shs in treas in "pool int." ③Reduced by $545,000 (1972, $548,000; 1971, $281,000) invest tax credit. ④From U S dollar devaluation on Swiss franc loan. ⑤As reported on 9,848,000 (1972, 10,163,000; 1971, 9,794,000) aver com & com equiv sh. ⑥Incl Miles Homes Companies from June 1, 1972, date of acq. ⑦$1.31 in 1972 and $1.07 in 1971 before extraord chg.

Note: Earn com sh amounted to $1.27 in 1973, $1.11 ($1.22 bef extraord chg) in 1972 & $1.01 ($1.05 bef extraord chg) in 1971 assum. full dilution.

Consolidated Balance Sheet, as of Dec. 31 (000 omitted):

	1973	④1972
Assets:		
Cash	8,355	21,743
Mkt sec, cost	......	150
Receiv, net	90,413	89,386
②Inventories	92,216	90,788
Prepayments	2,880	3,144
Total current	202,070	205,620
①Net prop, etc	71,640	70,874
Other assets	15,030	6,981
Intangibles	50,098	52,735
Def chgs	3,370	4,328
Total	343,138	340,136
Liabilities:		
Notes payable	51,387	47,504
Accts, etc, pay	31,968	29,630
Customers dep	7,077	6,252
Income taxes	16,276	17,473
Total current	106,430	100,868
Deb 5¾s, 1989	7,320	11,470
Deb 5s, 1993	32,375	35,375
Notes pay	79,832	80,115
Def inc tax, etc	13,269	11,470
8% pfd stk ($25)	937	939
③Conv A pfd	1,513	1,513
③Com stk	49,856	49,833
Retained earnings	57,121	49,312
Stockhold equity	109,429	101,819
③Reacquired stk	5,939	1,181
Net stkhld eq	103,490	100,638
Total	343,138	340,136
Net curr assets	95,639	104,758
①Deprec	52,000	54,397

②Lower of cost or mkt. ③317,571 (1972, 85,171) com shs at cost. ③738,847 no par shs; 9,425,000 (1972, 9,426,961) par $1 shs. ④Reclassified for comparative purposes.

Long Term Debt Outstg Dec. 31, 1973 (excluding current portion): $32,702,000 senior long term debt comprised of:

(1) $15,000,000 8¼% notes payable to an insurance company due $1,340,000 annually beginning 1979.

(2) $17,000,000 7¼% Swiss franc loan due July 15, 1976. Loan may be prepaid at the option of Co. at 101.5% of principal amount from July 15, 1974 to July 14, 1975 and at 101 thereafter.

(3) $13,700,000 5¾% to 8¾% miscellaneous debt due to 1990.

Insilco Overseas Capital Corporation N.V. Guaranteed Floating Rate Loan notes due 1980:

AUTH.—$25,000,000; outstg., Dec. 31, 1973, $8,670,000.
DATED—July 31, 1970. DUE—July 31, 1980.
INTEREST—Fixed twice yearly at 1% above the six month London Eurodollar rate with 7½% minimum, current rate is 10⅛% to July 31, 1974.
DENOMINATION—Bearer coupon from $1,000, $10,000, $100,000 and $500,000.
SINKING FUND—Two annual payments of $2,500,000 each on July 31, 1971 and 1972 and seven annual payments of $1,000,000 on July 31, 1973 through 1979. The balance of $13,000,000 will mature on July 31, 1980.
SECURITY—Not secured senior indebtedness, guaranteed by Insilco.
DIVIDEND RESTRICTION—Co. may not pay cash divs. on or acquire com. in excess of consolidated net income after Dec. 31, 1966 plus net proceeds from sale of stock or debt converted into stock after Dec. 31, 1967 plus $10,000,000.

Convertible Debt: 1. International Silver Co. convertible subordinated debenture 5s, due 1993:

Rating—Ba

AUTHORIZED—$35,775,000; outstanding, Dec. 31, 1973, $32,375,000.
DATED—Jan. 1, 1968. DUE—Jan. 1, 1993.
INTEREST—J&J1 to registered holders.
TRUSTEE—Irving Trust Co., NYC.
DENOMINATION—Fully registered, $100, $500, $1,000 and authorized multiples of $1,000 thereof.
CALLABLE—As a whole or in part on at least 30 days notice to each Dec. 31 incl., as follows:

1974 ..	103⅝	1975 ...	103	1976 ..	102⅝
1977 ..	102¼	1978 ...	102⅛	1979 ..	102
1980 ..	101⅝	1981 ...	101¼	1982 ..	101⅛
1983 ..	101	1984 ...	100⅝	1985 ...	100¼
1986 ..	100⅛	After ...	100		

Also callable for sinking fund (which see) at par.
SINKING FUND—Annually, to retire debs. at par each Jan. 1, 1979-92, cash (or debs.) equal to $1,750,000 debs. outstg. plus similar optional payments.
SECURITY—Not secured, subordinated to all senior debt.
CONVERTIBLE—Into com. at any time (if called, on or before 15th day prior to redemption date) at $33.33 a sh. No adjustment for interest or divs. Cash paid in lieu of fractional shs. Conversion privilege protected against dilution.
DIVIDEND RESTRICTION—Co. may not pay cash divs. on or acquire capital stock in excess of consolidated net income after Dec. 31, 1966 plus proceeds from sale of stock or debt converted into stock after such date plus $10,000,000.
ADDITIONAL DEBT—May be created if immediately thereafter, consolidated tangible assets less consolidated liabilities (less funded debt) is at least 200% of funded debt.
INDENTURE MODIFICATION—Indenture may be modified, except as provided, with consent of 66⅔% of debs. outstg.
LISTED—On New York Stock Exchange.
PURPOSE—Proceeds to retire debt and for general purposes.
OFFERED—See Debenture Subscription Rights below.

PRICE RANGE—	1973	1972	1971	1970	1969
High	74½	88	89½	81½	110
Low	52	68⅜	71½	58½	76

Debenture Exchange Offer: In Apr. 1974 company offered to exchange $830 principal amount of 9¾% Ba rated convertible subord. debs. due Apr. 1, 1999 for each $1,000 principal amount of 5s, due 1993. New debs. conv. into common at $33.33 per sh. Offer expires May 21, 1974.

2. International Silver Co. convertible subordinated debenture 5¾s, due 1989:

Rating—Ba

AUTH.—$28,207,000; outstg., Dec. 31, 1973, $11,470,000.
DATED—Jan. 1, 1969. DUE—Jan. 1, 1989.
INTEREST—J&J1.
TRUSTEE—Schroder Trust Co., NYC.
DENOMINATION—Fully registered, $100, $500, $1,000 and authorized multiples of $1,000

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Transfer Agent, Registrar and Dividend Disbursing Agent: Security Trust Co., Rochester, N Y

Recapitalization: On Sept. 30, 1968, each share of 7% $100 par preferred with arrears of $40.75 per share was exchanged for seven $20 par 5% preferred shares (since retired), and three $5 par common shares, and each $10 par common share was exchanged for two $5 par common shares.

HOWARD JOHNSON CO.

History: Incorporated in Maryland Mar. 10, 1961, succeeding business established in 1925.

In Mar 1973 Co acquired 4 Howard Johnson restaurants from Tower Grill of Pennsylvania Inc for an undisclosed cash sum.

Business: Company operates and supplies chain of Howard Johnson's, Red Coach Grill, and Ground Round restaurants and also operates and licenses "Howard Johnson's Motor Lodges." In addition, company processes and distributes frozen and packaged foods.

Also, company through Landmark Supply Division, sells motor lodge and restaurant equipment and furnishings. In 1966, formed Automatic Merchandising Division which markets its own and other companies products.

As of Dec 29, 1973, chain included 881 Howard Johnson's restaurants (611 operated by company and 270 by licensees), 29 Red Coach Grill's restaurants (26 operated by company and 3 by licensees), 34 Ground Round restaurants, and 493 Howard Johnson's Motor Lodges (119 operated by company and 374 by licensees), in 40 states, Bahamas, Puerto Rico, B W I, Dist of Col, and Canada.

Property: Co operates 9 manufacturing and processing plants, 9 distribution centers and 8 vending warehouses in 13 states, aggregating 737,300 sq ft of floor space.

Subsidiaries: Company has numerous subsidiaries operating in the same general field.

Officers

H B Johnson, Chmn & President
F M Barrett, Senior Vice-Pres

Exec Vice-Presidents

D R Shaughnessy — A A Stambaugh, Jr.

Group Vice-Presidents

G F Laue — H J Kelly
L M Bell, Jr — A J Imperiali
W W Lee, Jr

Vice-Presidents

Pierre Franey — J K Delahunt
A P Barrett — P J Errog
V E Burke — R M Hamilton
F J Launette — D G Friedl
R W Smith — J M Mosser
W W Curcio — W P Prendergast
B M Sack — R M MacKinnon
J A Lucas — D F Pierce
E L Andlauer, Vice-Pres & Treas
E J Durgin, Vice-Pres & Sec
E J Gallagher, Vice-Pres & Contr

Directors: H B Johnson, C M Enders, R C Damon, E J Durgin, Fred Smith, Hoyt Ammidon, A A Stambaugh, J H Rambin, Jr, D R Shaughnessy

Counsel: Herrick, Smith, Donald, Farley & Ketchum, Boston

Auditors: Price Waterhouse & Co

Annual Meeting: Last Monday in April

No. of Stockholders: Dec 31, 1973, 15,700.

No. of Employees: Dec 31, 1973, 31,000.

Office: 1 Howard Johnson Plaza, Dorchester, Mass 02125

Consolidated Income Account, years ended (1000 omitted)

	Dec 29 '73	Dec 29 '72
Net sales	302 027	262 300
Licensing etc	54 638	61 575
Gain assets sold	468	296
Total income	356 931	324 719
Cost of sales, etc	225 087	206 763
Selling etc exp	77 707	69 508
Depreciation	12 207	10 668
Interest	285	263
[3]Fed income tax	19 678	17 400
Extraord credit	[4]3 700	[5]2,444
Net income	25 178	19 879
Retain earn 1-1	106 630	91 395
Dividends (cash)	4 150	3 035
Retain earn 12-31	129 467	106 430
[6]Earn com sh	$1 16	$0 92
Yr end com shs	21 851 910	21 723 400

[3]Reduced by $1 059 000 (1972 $772 000) due to invest tax cred [4]Gain on sale of real estate less $712 000 applicable inc taxes [6]As reported on 21 619 000 (1972 21 644 000) aver shs $1 05 (1972 $0 90) bef extraord credit [5]Gain from sale of real estate, less $250 000 loss from discontinuance of N J Turnpike opers

Consolidated Sales & Earnings years ended Dec. 31 ($000)

Yr	Sales	Net Income	[1]Ave Com Shs	Earn Av Com A B Sh
1971	298 058	15 765	10 767	0 73
1970	291 791	[2]11 616	20 038	[2]0 57
1969	290 483	9 029	20 018	0 45
1968	237,415	[2]9,301	19,914	[2]0 46
1967	211,252	8,387	19,780	0 43
1966	200,058	9,285	19,666	0 47

[1]As reported by company
[2]Before extraordinary gains: 1970, $707,000 ($0 04), 1968, $1,814 000 ($0 09).

Consolidated Balance Sheet, as of ($000 omitted):

Assets:	Dec 29 '73	Dec. 29, '72
Cash	2,430	3,292
Mkt sec cost	30 131	31 302
Accts receiv, net	8 571	6,102
[1]Inventories	16 178	12,318
Prepayments	2 635	2,637
Total current	78 166	74,831
[2]Net property	181 437	99,079
Other assets	1,918	1 936
Total	261,521	175,846
Liabilities:		
Notes, etc, pay	267	290
Accts pay, etc	13 689	13,266
Dividends pay	1 092	869
Fed income tax	4 555	4,185
Total current	19 604	18,609
Notes payable	3,024	3,256
Def inc taxes	5 330	3,960
Common stk ($1)	21 852	21,724
Capital surplus	21 336	19,848
Retained earnings	129 467	106,430
Total	201 521	175,846
Net current assets	58 562	56,222
Net tang com sh	$7 98	$6 91
[2]Depreciation	74,932	68,327

[1]Lower ever cost or mkt

Mortgage Debt: Outstg Dec 29, 1973, $4,191,000 5%-10% real estate and chattel mortgages due

Aggregate amount which mature in each of the years 1973-78 are $555,000, $338,000, $273,000 and $276,000, respectively

Capital Stock: 1. Howard Johnson Co. common; par $1:

AUTHORIZED—30,000,000 shares; outstanding, Dec 29, 1973, 21,851,910 shs; reserved for options 666,692 shs; par $1

$1 par shares split 2-for-1, Aug 7, 1972.

VOTING RIGHTS—Has one vote per share.

PREEMPTIVE RIGHTS—None.

Dividends

1963-66 [1] ... [2]1967 ... $0 10 ... 1968 ... $0 20
[2]1969 ... 0 22 ... 1970 ... 0 24 ... 1971 ... 0.24
1972 ... 0 18

After 2-for-1 split

1972 ... 0 40 ... 1973 ... 0 18 ... [3]1974 ... 0 05

[1]Paid 2% stock dividend in 1963, 1964 and 1965; 2% Mar 31, 1966 and 100% May 20, 1966, 1967 1%, May 5, 1969, 100%.

[3]To Jan 31

TRANSFER AGENTS: First National Bank of Boston, Chase Manhattan Bank, New York

REGISTRARS: State Street Bank & Trust Co., Boston; Manufacturers Hanover Trust Co, New York

OFFERED: (660,000 shares) at $38 a share on May 18, 1961 by Blyth & Co, Inc, New York, F S Moseley & Co Boston and associates. Offering did not represent company financing.

(370,000 shares) at $51 a share on Mar 28, 1962 by Blyth & Co Inc New York, and associates. Offering did not represent company financing.

(330,000 shares) at $80 a sh on Mar 26, 1963 by Blyth & Co Inc and Glore Forgan, Wm R Staats Inc, NYC, F S Moseley & Co, Boston, and associates. Offering did not represent new financing.

(650,000 shares) at $48 a sh on Aug 17, 1967 to Blyth & Co Inc, F S Moseley & Co and Alex Brown & Sons and associates. Offering did not represent new financing.

(600,000 shares) at $26.37 a sh on Feb 25, 1971 by Blyth & Co Inc, F S Moseley & Co and Alex Brown & Sons and associates. Proceeds for expansion and working capital.

(1,150,000 shares) at $24.625 a sh on Sept 20, 1972 thru Blyth Eastman Dillon & Co, Inc, F S Mosley & Co and Alex Brown & Sons and associates. Offering does not represent new financing as 800,000 shs were offered by the estate of the late Howard D Johnson, founder, and 350,000 shs by Mrs Dorothy Weeks, his daughter.

(650,000 $1 par shs) at $16.25 a sh on June 20, 1973 thru Blyth Eastman Dillon & Co, Inc, F S Moseley, Estabrook, Inc and Alex Brown & Sons and associates. Offering did not represent new financing as all the shs are being sold by Tower Grill of Pennsylvania Inc.

LISTED: On NYSE (Symbol HJ); unlisted trading on Boston, Midwest, PBW, Cincinnati and Detroit Stock Exchanges.

PRICE RANGE—	1973[1]	1972	1971	1970[2]	1969
High	36⅞	33⅛	40⅝	23⅝	28⅛
Low	10	22⅞	20⅝	11⅛	17⅛

[1]After 100% stk div, before 58.65
[2]After 2-for-1 split, before 58⅜, 37⅜.

INSILCO CORP.

History: Incorporated in Connecticut Apr 30, 1946 as International Silver Co; present name adopted Apr 18, 1969. Effective July 1, 1946, was merged with and became successor to corporation of similar name incorporated in New Jersey, Nov. 19, 1898, latter formed to acquire all property, business and assets of a number of silverware manufacturing companies, the earliest founded in 1808. For list of companies acquired, see Moody's 1949 Industrial Manual.

In the 1946 merger a recapitalization was also effected by exchange of 4 $25 par preferred shares for each $100 par share and exchange of 4 $25 par common shares for each $50 par share.

In Mar 1955, purchased Times Wire & Cable Co, Inc (now a subsidiary).

In Jan 1958 acquired certain assets of Eyelet Specialty Co, Waterbury, Conn (sold in 1973).

On Oct. 31, 1960 acquired assets of Eastwood-Nealley Corp., Belleville, N J (sold in 1967) and affiliate Drycor Felt Co, Staffordville, Conn (Drycor Felt Co., a subsidiary, was sold in 1964). In Dec., 1961, acquired Church Metalware division of Benziger Bros., New York.

In Aug 1962, acquired W H Hutchinson & Son, Inc, Chicago, for about $9,000,000 cash (now a subsidiary).

In Nov 1964, acquired Steel Parts Corp, Indianapolis, Ind, for about $10,000,000 cash.

In Apr 1966, acquired Hawthorne Metal Products, Co, Royal Oak, Mich.

In May 1966, acquired United Tool & Plastics, Inc, Bridgeport, Conn., through a pooling of interests (sold with Eyelet Specialty Co., Inc in 1973).

In Aug 1967, organized World Tableware Corp which in turn purchased a controlling interest in International Tableware Industrial Corp of Taiwan.

On Sept 18, 1967 merged Taylor Publishing Co., Dallas, Tex by issuance of 1,151,386 shares convertible ser A second preferred in exchange for a like number of Taylor common shares. Company acquired remaining 154,281 Taylor common shares for $3,857,000 cash.

In Apr 1968, acquired Stewart Stamping Corp., Yonkers, N. Y. and American Components, Inc.

In Jan. 1969 company acquired Enterprise Paint Co., Chicago, Ill thru exchange of $100 of convertible debenture 5⅝s for each 3 Enterprise common shares.

In May, 1969, a subsidiary acquired Kennikat Press, Inc, Port Washington, N Y. In June 1969, acquired Stanley Roberts Co, New York City, and its affiliate, Gifts Inc. (Stanley Roberts, Inc. and Kennikat Press, Inc sold in 1973).

In Aug., 1969, formed One Way Tableware Corp, Wallingford, Conn.

In Feb 1970 acquired Peerless Wire Goods Inc Lafayette Ind.

In Feb 1970 acquired Zephyr American Corp.

In 1970 acquired Frisch & Co., Inc, Paterson, N J.

On May 11, 1970, Taylor Publishing Co. acquired Dukane Press, Inc at $8 a sh for each 33,784 shs of Dukane (now operated as International Graphics, Inc.)

In Oct, 1970 acquired Massasoit Trading Co Holyoke Mass.

In Apr, 1971 acquired Sinclair Paint Co., Los Angeles and McDonald Products Corp., Buffalo, N Y.

In May, 1971 acquired Red Devil Paints, Inc, and Red Devil Chemicals Inc., Mt Vernon, N Y.

On June 8, 1971 acquired Roth Greeting Cards, Canoga Park Calif. Through exchange of 0.5 common share for each Roth common share.

In Aug 1971 acquired Interlox Punch & Die Corp.

In Sept. 1971 acquired Woolley Paint Co.

In June 1972 acquired Miles Homes Companies for $1,000,000 in cash and $25,000,000 in convertible subordinated notes.

In 1972 acquired Connoisseur Studio, Inc, A & B Tool Co., and Tobey Color Card Co for an aggregate 303,200 shares of common stock.

In 1972 sold International Silver Co of Canada Ltd.

Divestiture: In connection with 1971 Justice Dept civil suit alleging Co's 1969 acquisition of Stanley Roberts, Inc violated antimerger section of Clayton Antitrust Act and that acquisition illegally eliminated competition between 2 Cos in sale of stainless steel flatware and increased concentration among sellers of flatware, Co sold Stanley Roberts in 1973.

Business: Company is a diversified operating company with subsidiaries engaged in manufacture of CATV cable and assemblies, stampings for electronics/electrical industry, resistors and capacitors, automotive, truck and farm equipment parts, paints, high school and college yearbooks, financial and commercial printing, greeting cards, hobby crafts, office and desk-top accessories, crown bottle caps, coated wire baskets and racks used in appliances, tableware, and instructions, materials and financing for "do-it-yourself" home building.

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Business Week index

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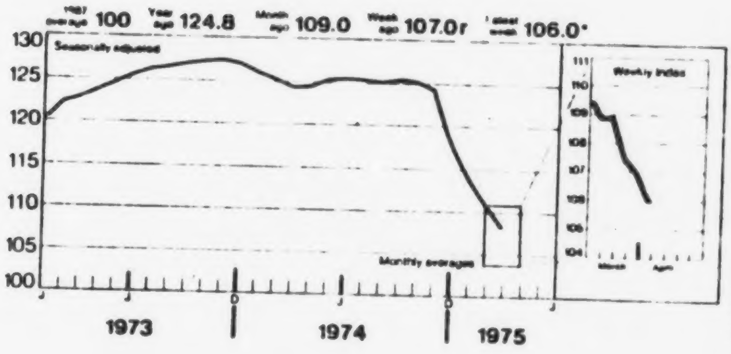

The index dropped sharply for the week ended Apr 5. After seasonal adjustment, truck output fell sharply as Ford closed four plants for inventory adjustment. Auto assemblies decreased substantially, hampered by a snowstorm in Michigan. Paper and paperboard production continued to decline for the third consecutive week. Losses were also posted in steel, lumber, electric power, intercity trucking, and rail freight. Crude-oil refinery runs turned up significantly after three weeks of declines. Bituminous coal output increased slightly, after adjustment for a miners' holiday.

Figures of the week

Production		Latest week	Previous week	Month ago	Year ago	1967 average
Raw steel/Amer. Iron & Steel Inst., thous. of net tons	Apr 12	2,541	2,563 ■	2,718	2,904	2,440
Automobiles/Ward's Automotive Reports	Apr 12	130,888	118,475r ■	130,834	133,889	142,438
Trucks/Ward's Automotive Reports	Apr 12	42,485	34,102r ■	41,128	44,703	30,490
Electric power/Edison Elec. Inst., millions of kilowatt-hours	Apr 12	34,348	34,684 ■	36,199	33,280	23,169
Crude oil, refinery runs/Amer. Pet. Inst., daily av., thous. of bbl	Apr 12	11,753	12,031r ■	11,953	11,808	9,815
Bituminous coal/Bureau of Mines, thous. of net tons	Apr 5	11,245■	11,920r	12,885	11,280	10,627
Paperboard/Amer. Paper Inst., thous. of tons	Apr 12	449.5	402.4 ■	443.9	587.8	438.8
Paper/Amer. Paper Inst., thous. of tons	Apr 5	375.0■	395.0r	398.0	554.0	402.8
Lumber/WWPA[1], SFPA[2], 225 mills, millions of feet	Apr 5	177.6■	181.9	182.5	264.2	186.4
Trade						
Rail freight traffic/Assn. of Amer. RRs, billions of ton-miles	Apr 5	14.2■	13.8	14.9	16.5	13.8
Intercity truck tonnage/Amer. Truck Assn. Inc., unadj., index	Apr 5	84■	84	87	105	100
Retail sales/Census Bur., unadj., in millions	Apr 5	$10,588	$11,013r	$10,279	$10,078	$6,035
Department store sales/Census Bur., unadj., in millions	Apr 5	$994	$1,094r	$935	$1,015	$527
Prices						
Industrial raw materials, 13 spot commodities/BLS Tues. index	Apr 8	184.0	185.4	182.7	238.8	100
Foodstuffs, 9 spot commodities/BLS Tues. index	Apr 8	225.2	232.8	227.1	217.2	100
Finished steel composite/Iron Age, lb	Apr 14	12.928¢	12.928¢	12.928¢	10.033¢	6.464¢
Copper/electrolytic, del., Metals Week, lb	Apr 12	64.2¢	64.2¢	64.2¢	68.6¢	38.6¢
Aluminum, primary ingot/major U.S. producer, Metals Week, lb	Apr 12	39.0¢	39.0¢	39.0¢	31.5¢	25.0¢
Wheat/No. 2 hard, Kansas City Grain Market Review, bu	Apr 12	$3.85	$4.03r	$3.76	$4.20	$1.68
Cotton/strict low middling 1-1/16 in., USDA, lb	Apr 16	39.47¢	39.69¢	37.46¢	64.11¢	25.20¢
Gold/Wed. final setting, London open mkt., troy oz	*Apr 16	$166.500	$173.100	$178.500	$169.900	$35.000
Finance						
Prime commercial paper rate/dealer, 91-119 days, Fed. Res.	Apr 12	6.18%	6.03%	6.08%	9.70%	NA
AA corporate bond yield/S&P	Apr 16	8.93%	8.96%r	8.77%	8.24%	5.66%
Euro-dollar rate/3-month, Fed. Res.	Apr 9	7.44%	6.98%	6.81%	10.13%	5.38%
Money supply (M_1)/Fed. Res., seas. adj., in billions	Apr 2	$287.6	$287.3r	$285.2	$276.4	$181.7
Commercial, industr., and ag. loans†/Fed. Res., in millions	Apr 9	NA	$129,377	$128,703	$122,833	$64,471
Free reserves/Fed. Res., in millions	Apr 9	$90	$281r	$205	$1,091	$195

Monthly figures		Latest month	Month ago	Year ago	1967 average
Housing starts/Comm. Dept., seas. adj. annual rate, in thous.	February	877	996r	1,881	1,292
Personal income/Comm. Dept., seas. adj. annual rate, in billions	February	$1,184.0	$1,191.1r	$1,113.4	$629.3
Wholesale & retail inventories/Comm. Dept., seas. adj., in billions	January	$120.2	$121.4r	$104.3	$60.5

■ Used in computing Business Week index (chart); other components (not listed) are machinery, defense & space equipment.
* Preliminary, week ended Mar 8 1975
[1] Western Wood Products Association
† Reporting member banks
[2] Southern Forest Products Association
r Revised
NA Not available

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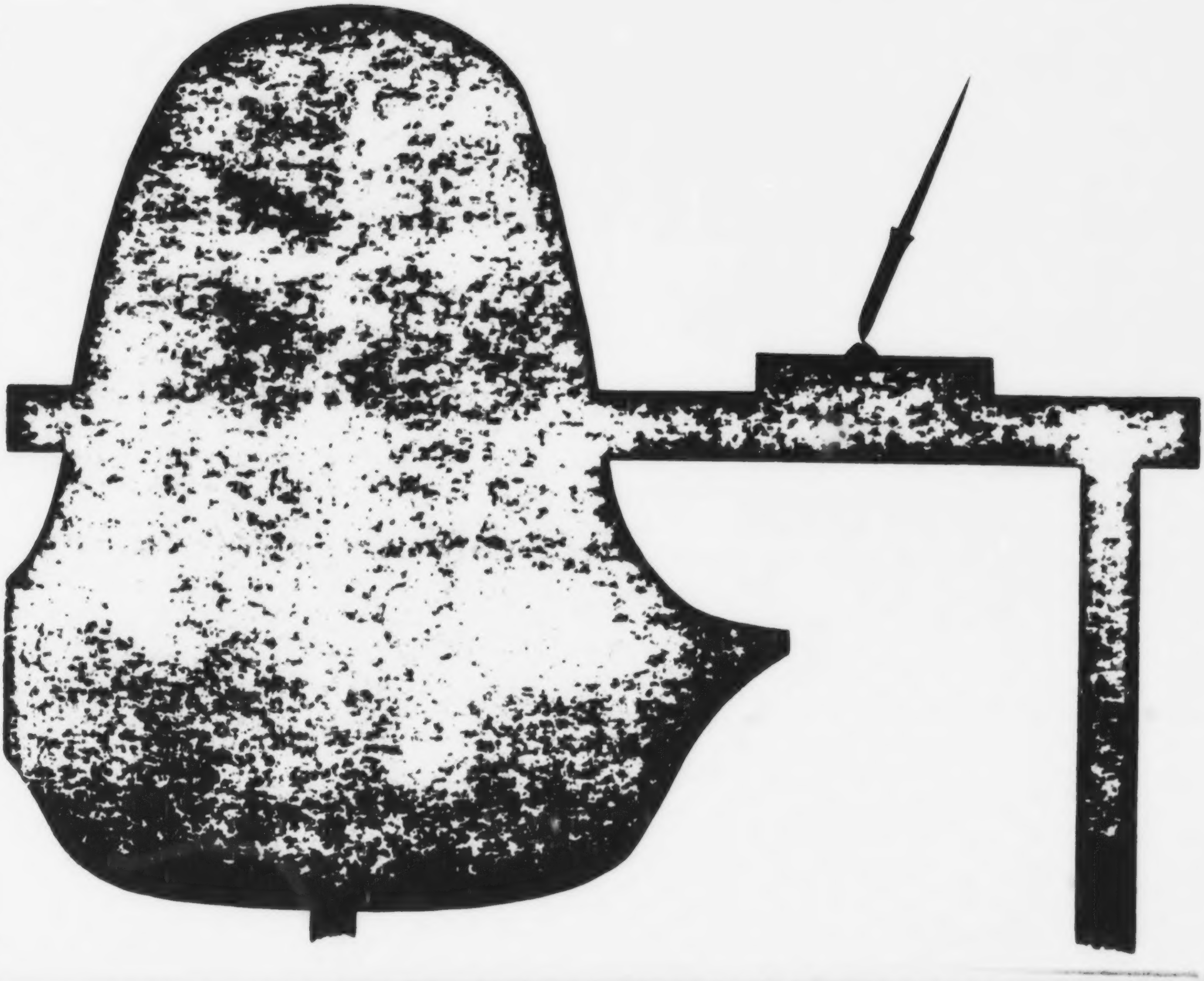
STATISTICS OF INCOME 1970

CORPORATION INCOME TAX RETURNS

Internal Revenue Service

Publication [illegible] (3-74)



RETURNS WITH NET INCOME

Table 3.--BALANCE SHEETS AND INCOME STATEMENTS, BY MAJOR INDUSTRY--Continued

[All figures are estimates based on samples—money amounts are in thousands of dollars]

	Item	Major industry--Continued										
		Manufacturing--Continued										
		Tobacco manufactures	Textile mill products	Apparel and other fabricated textile products	Lumber and wood products, except furniture	Furniture and fixtures	Paper and allied products	Printing and publishing	Chemicals and allied products	Petroleum refining and related industries	Rubber and miscellaneous plastics products	Leather and leather products
		(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
1	Number of returns with net income	61	4,445	12,055	5,410	4,229	2,615	15,845	6,506	667	3,134	1,493
2	Total assets	6,108,768	12,047,391	8,778,061	9,217,123	3,266,492	19,463,566	16,895,311	49,188,770	91,090,933	10,065,667	2,774,625
3	Cash	138,861	558,076	605,507	369,844	205,731	522,306	1,092,483	1,479,939	1,710,583	431,016	162,305
4	Notes and accounts receivable	467,663	3,197,006	2,754,249	1,396,332	895,670	2,678,761	3,976,190	9,228,467	15,195,142	2,453,695	712,493
5	Less: Allowance for bad debts	6,471	18,506	39,862	23,889	18,766	70,587	338,686	160,392	226,420	48,731	10,918
6	Inventories	2,363,444	2,905,488	2,880,193	1,473,032	903,607	2,734,879	1,803,225	8,888,675	5,657,617	2,276,971	712,859
	Investments in Government obligations:											
7	United States	1,001	52,169	22,926	21,966	46,965	138,910	201,616	335,473	873,026	39,275	8,120
8	State and local	1,733	37,729	8,217	25,617	24,633	72,373	131,372	126,668	95,536	36,423	16,525
9	Other current assets	70,437	233,963	368,178	248,436	84,651	506,197	751,390	1,266,332	2,331,274	88,888	50,126
10	Loans to stockholders	225	9,907	48,606	13,776	6,596	25,115	64,123	26,174	96,758	20,619	6,195
11	Mortgage and real estate loans	508	19,238	7,253	7,641	3,533	283,800	17,856	20,983	86,137	639	3,926
12	Other investments	1,606,353	1,027,126	797,612	797,337	270,775	2,679,308	2,512,035	7,712,557	19,957,832	1,009,606	560,880
13	Depreciable assets	1,454,870	7,788,974	2,019,383	6,022,566	1,347,621	15,202,882	8,606,679	35,910,319	63,615,271	6,476,506	869,602
14	Less: Accumulated depreciation	412,150	4,024,812	965,648	2,648,605	646,713	6,764,361	3,838,363	18,287,426	31,577,565	3,090,238	467,630
15	Depletable assets	64,383	341	577	1,089,184	3,088	867,672	91,583	906,831	6,714,815	14,363	3
16	Less: Accumulated depletion	-	113	-	41,481	873	158,389	13,637	138,193	2,900,795	5,817	3
17	Land	27,746	77,977	59,873	186,099	56,856	380,565	393,996	813,777	3,179,279	117,116	27,460
18	Intangible assets (amortizable)	6,709	17,165	15,677	5,531	4,087	29,751	120,227	361,612	7,437,686	24,322	881
19	Less: Accumulated amortization	1,301	6,386	7,162	2,979	2,280	13,295	48,878	101,927	6,160,685	12,658	437
20	Other assets	386,957	192,987	302,464	296,760	59,335	369,699	1,569,913	1,399,101	2,987,444	283,576	122,238
21	Total liabilities	6,108,768	12,047,391	8,778,061	9,217,123	3,266,492	19,463,566	16,895,311	49,188,770	91,090,933	10,065,667	2,774,625
22	Accounts payable	221,985	1,454,028	1,793,762	647,802	378,590	1,510,816	1,405,516	4,625,011	7,933,056	1,010,726	320,613
23	Mortgages, notes, and bonds payable in less than one year	770,920	1,292,401	953,601	656,298	238,742	960,836	971,738	1,780,636	2,089,936	868,922	248,752
24	Other current liabilities	371,158	666,359	722,723	430,672	257,753	1,579,290	1,513,697	3,158,635	3,775,329	917,365	193,783
25	Loans from stockholders	27	58,316	118,511	67,050	59,256	72,303	148,016	200,679	52,486	77,391	16,511
26	Mortgages, notes, and bonds payable in one year or more	1,190,589	1,581,817	858,256	1,989,462	312,622	4,091,702	2,360,285	9,276,108	13,662,962	2,015,368	310,371
27	Other liabilities	185,548	176,073	186,961	465,606	65,058	768,266	1,189,091	1,391,875	7,318,732	233,892	106,651
28	Capital stock	766,360	1,229,995	959,091	1,251,819	463,356	2,241,691	1,866,516	5,361,019	10,956,103	635,191	452,569
29	Paid-in or capital surplus	360,956	627,707	551,802	1,050,173	182,880	2,050,537	1,339,768	5,823,802	12,653,078	995,638	228,773
30	Retained earnings, appropriated	195,056	26,711	12,762	7,395	13,671	322,160	59,801	181,896	559,093	33,597	2,321
31	Retained earnings, unappropriated	2,161,307	5,089,688	3,729,773	2,725,509	1,346,608	6,019,067	6,309,762	17,647,167	32,616,162	3,370,068	987,135
32	Less: Cost of treasury stock	83,333	156,102	107,159	74,463	33,822	113,098	246,657	638,058	526,780	90,651	90,686
33	Total receipts	7,177,881	17,926,476	19,308,094	10,611,605	6,450,819	20,159,185	22,566,849	55,290,267	79,214,964	13,985,436	4,550,187
34	Business receipts	7,082,610	17,673,975	19,117,507	10,356,803	6,369,150	19,439,366	21,840,362	53,321,068	73,770,387	13,690,983	4,437,512
	Interest on Government obligations:											
35	United States	248	5,279	1,275	2,232	2,606	5,010	16,987	25,491	66,986	2,376	280
36	State and local	361	1,979	1,036	1,508	1,126	7,368	12,268	12,726	8,099	867	778
37	Other interest	31,026	63,570	40,613	48,150	11,607	125,055	95,361	252,916	650,832	61,828	11,661
38	Rents	21,093	26,723	11,816	18,266	7,050	65,879	75,806	71,216	619,563	18,727	6,297
39	Royalties	7,868	10,080	29,950	7,549	1,062	38,856	62,370	306,381	85,352	26,952	2,055
40	Net short-term capital gain reduced by net long-term capital loss	1	63	853	676	136	633	827	6,131	11,387	243	78
41	Net long-term capital gain reduced by net short-term capital loss	1,567	25,105	4,726	368,738	3,679	285,769	60,862	251,579	163,277	29,897	38,879
42	Net gain, noncapital assets	387	3,818	2,348	21,623	1,792	4,975	11,369	25,888	62,735	3,776	686
43	Dividends, domestic corporations	11,566	12,296	6,005	2,366	2,188	22,270	39,955	86,265	967,197	5,238	16,466
44	Dividends, foreign corporations	3,952	7,311	3,429	8,288	705	56,906	14,606	653,307	831,216	89,259	664
45	Other receipts	17,224	96,277	88,545	75,650	69,928	129,160	316,096	483,281	1,991,935	77,312	36,853
46	Total deductions	6,286,744	16,955,376	18,464,347	10,073,451	6,068,234	18,997,552	20,762,066	50,350,440	76,674,380	13,366,121	4,259,737
47	Cost of sales and operations	4,036,510	13,476,955	16,487,792	7,361,439	4,515,686	13,368,618	13,696,827	32,476,426	50,011,525	9,542,551	3,265,493
48	Compensation of officers	17,369	236,476	467,129	187,683	192,867	165,702	633,087	412,718	106,855	161,535	78,678
49	Repairs	37,962	144,915	39,766	91,842	27,437	448,659	120,169	767,850	1,186,421	181,377	28,218
50	Bad debts	2,799	28,400	25,971	16,977	15,412	32,658	127,909	96,160	238,332	42,401	8,037
51	Rent paid on business property	63,586	143,809	188,134	66,764	65,120	209,622	280,382	476,895	1,232,458	176,665	56,993
52	Taxes paid	1,020,587	383,898	389,690	286,390	152,026	479,082	362,822	1,096,627	4,269,383	390,595	106,202
53	Interest paid	133,636	250,328	186,110	131,666	46,096	377,109	263,960	736,589	1,210,667	206,809	52,863
54	Contributions or gifts	4,523	10,936	13,529	5,096	4,093	12,318	31,735	65,198	29,766	4,377	4,825
55	Amortization	928	1,556	876	6,585	297	8,956	8,518	7,579	18,806	1,821	252
56	Depreciation	126,515	563,167	165,028	388,278	98,581	872,469	588,106	2,188,177	2,876,121	459,721	57,139
57	Depletion	1,458	136	233	408,366	138	126,690	9,361	116,228	2,777,080	1,868	119
58	Advertising	358,377	115,213	125,068	48,165	66,623	172,573	200,679	2,247,691	371,596	173,908	66,136
59	Pension, profit sharing, stock bonus, annuity plans	55,969	95,815	86,786	42,305	43,303	149,286	212,701	615,728	471,315	177,716	30,368
60	Other employee benefit plans	41,339	49,258	57,587	28,664	25,696	106,596	113,476	295,932	212,086	123,300	20,920
61	Net loss, noncapital assets	1,467	7,738	1,067	3,326	1,396	1,003	7,797	6,152	31,765	1,303	338
62	Other deductions	383,481	1,466,776	2,223,603	979,905	813,471	2,468,213	3,906,577	8,568,712	9,636,250	1,726,816	485,176
63	Total receipts less total deductions	891,137	971,102	843,747	538,154	382,585	1,161,633	1,806,783	4,939,807	4,540,584	619,313	290,450
64	Constructive taxable income from related foreign corporations	2,508	3,590	2,356	4,191	171	36,919	9,207	233,381	106,686	17,026	492
65	Net income (63 plus 64 minus 36)	893,286	972,713	845,069	540,837	381,630	1,191,206	1,801,762	5,160,466	4,637,169	635,490	290,166
66	Income subject to tax	880,773	916,657	748,985	498,556	355,830	1,166,270	1,651,690	4,981,699	3,677,062	606,185	259,627
67	Income tax, total[1]	433,052	435,632	339,972	179,281	162,566	502,506	768,655	2,389,830	1,922,973	286,270	116,726
68	Normal tax and surtax	422,273	421,764	330,935	170,356	158,426	486,263	748,363	2,321,861	1,732,891	276,530	112,458
69	Surcharge	10,515	12,765	8,167	4,468	3,851	12,386	18,396	53,396	43,631	7,597	3,378
70	Tax from recomputing prior year investment credit	265	687	218	309	163	693	1,346	10,106	1,619	1,675	308
71	Additional tax for tax preferences	-	23	9	3,029	2	4,891	126	4,179	145,027	555	563
72	Investment credit	3,406	10,036	1,440	7,637	725	32,132	11,150	83,377	96,743	12,340	312
73	Net income after tax (65 minus 67 plus 72)	463,636	547,317	506,537	369,193	219,809	720,030	1,066,237	2,856,011	2,808,939	361,560	173,750
	Distributions to stockholders:											
74	Cash and property except own stock	276,789	227,123	97,392	190,317	45,154	489,481	395,606	1,963,200	3,168,770	206,086	51,069
75	Corporation's own stock	13	8,017	16,135	101,628	3,918	60,937	18,080	89,616	72,861	14,288	9,247

Footnotes at end of table. See text for explanatory statements and for "Description of the Sample and Limitations of the Data."

SECTION C

USING INFLATION INDEXES

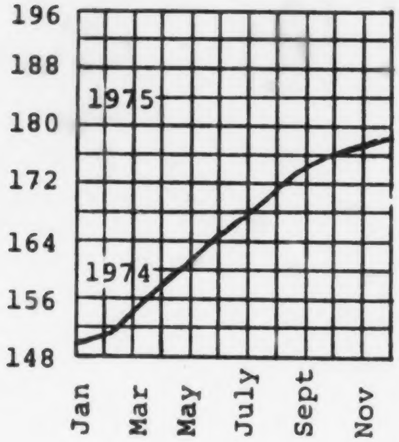
Fluctuations in the inflation rate affect both the purchase price of replacement equipment and annual operation and maintenance costs. Estimates of the cost of compliance must be adjusted accordingly.

INDEXING INFLATION

The civil assessment formula already takes the rate of inflation into account in estimating the costs of compliance. You must adjust the figure used each year to reflect the averate rate over the previous three years. You may use any source of information deemed appropriate by the Commissioner in order to calculate the rate. At present, the best source is the CE Plant Cost Index, published in the trade journal Chemical Engineering. It contains four major components:

1. Equipment machinery and supports;
2. Construction labor;
3. Building materials and labor;
4. Engineering supervision and manpower.

CE Plant Cost Index (1957-59 = 100)



Annual Index

1969 = 119.0

1970 = 125.7

1971 = 132.2

1972 = 137.2

1973 = 144.1

1974 = 165.4

CALCULATING THE RATE OF INFLATION

Using the CE Plant Cost Index, the rate of inflation (RI) to be used in the formula in 1975 would be 7.9 percent, calculated as follows:

(1) Find the average inflation rates for each of the previous three years by dividing each increase in the "index" rate by the base index rate:

The 1972 inflation rate equals $\frac{5}{132.2}$ or 3.8%

The 1973 inflation rate equals $\frac{6.9}{137.2}$ or 5.0%

The 1974 inflation rate equals $\frac{21.3}{144.4}$ or 14.8%

(2) Average each of these inflation rates.

The three year average equals $\underline{\underline{7.9\%}}$

SECTION D

ESTIMATING THE SOURCE'S INCOME TAX RATE

You will want to adjust the 48 percent tax rate assumption of the civil assessment formula for certain corporations and all individuals, partnerships and municipalities. (Regulatees with lower income tax liability are liable to significantly higher economic assessments than others.)

Corporations

There are three types of corporations that may have low income tax rates: (1) companies operating at a loss, (2) companies with extraordinary deductions or credits and (3) very small companies.

1. Corporations operating at a loss will be able to use accumulated tax advantages when they become profitable. There is no need to adjust the formula for this type of corporation.

2. Corporations with extraordinary deductions or credits are now generally confined to the extractive industries, including oil producing companies. In such a case, obtain the company's effective tax rate (the percent of its total pre-tax profit it pays in tax) and use it in the formula.

3. Very small corporations are taxed at lower rates currently (1975):

20% for the first $25,000 of taxable income;
22% for the second $25,000 of taxable income;
48% for taxable income over $50,000.

Unless this schedule is extended or otherwise changed, the rates in 1976 will revert to:

22% for the first $25,000 of taxable income;
26% for the second $25,000 of taxable income;
48% for taxable income over $50,000.

Where a corporation's taxable income is sufficiently low that its overall rate deviates substantially from 48 percent, you should obtain and use the company's actual effective tax rate.

Individuals and Partnerships

You should make an initial assumption of a 19 percent rate for individuals and an 18 percent rate for partnerships. These figures are based on averages, and are probably low estimates for most regulatees likely to be subject to civil assessments.

Municipalities and Non-Profit Institutions

When dealing with such entities, adjust the formula to assume a zero tax rate.

OBTAINING INDIVIDUAL RATES

1. For publicly held companies, you can find the necessary information in Moody's Industrial Manual, Standard and Poor or the Value Line Investment Survey. The first two are in the State Library.

2. For businesses, you should request the most recent balance sheets and income statements -- as you are empowered to under the regulations.

3. For individuals, you should request the most recent income tax statement. An individual is not obliged to provide this for you, but since the initial assumption is probably lower than his actual rate, he will probably comply with your request voluntarily.

ADJUSTING THE FORMULA FOR CHANGES IN THE TAX LAWS

From time to time provisions in the tax laws are changed. If such a change comes to your attention, consult Chapter I of Part 3 of this volume of the CEP Final Report in order to find precisely where the appropriate adjustments in the formula should be made.

SECTION E

HOW TO USE THE WANG CALCULATOR

A calculator provides a rapid, accurate, and low cost method of determining civil assessments. Connecticut is using a Wang Model 600 calculator for this purpose. If you do not have access to this machine, you can calculate assessments by hand with the formula given in Part III, Chapter I of this Volume. Also, in many cases, the Wang program can be adapted to be used on other programmable calculators. You should consult the User's Manual for whatever machine is available.

This section:

- Summarizes how the program works
- Explains how to place Connecticut's civil assessment formula on the Wang Model 600 calculator tape
- Explains how to run the program once a civil assessment tape is placed in the calculator.

HOW THE PROGRAM WORKS

The Wang program operates in several steps:

- It must have or be given information regarding each of the following variables:
  - CCE = The cost of installed pollution abatement equipment
  - OP = The cost of operating and maintaining control facilities
  - RI = The average rate of inflation over the last three years
  - EL = The expected life of needed pollution abatement equipment
  - T = The tax rate applicable to the source
  - TC = The Federal tax credit for purchasing pollution abatement facilities

- DL = The shortest allowed depreciable life (5 years or EL, whichever is shorter)

- CC = The cost of capital applicable to the source

The variable TC is programmed onto the tape and adjusted periodically as needed.* Other inputs, notably EL and T are typically also fixed values, but they may be changed in particular cases. The other inputs cannot have values entered directly onto the tape; this information must be given the machine case by case.**

---

* If the value of TC in the program is not the same as the actual tax credit given by the Federal Government, for example, you should change steps 0113 to 0116 so that they correctly input the value (1-TC). If TC was 10 percent (and (1-TC) = 90 percent), for example, these steps would read:

Step	Code	Symbol	Key	Comment
0116	0010	E10	.	
0117	0009	E9	9	
0118	0000	E0	0	
0119	0214	+14	+R	Add .90

In fact, the value used in this program may now be incorrect. As of September, 1975, the tax credit rate was 10 percent, but because the tax credit is scheduled to revert to 7 percent in January, 1976, the program uses the latter value.

In the absence of reliable information about a specific piece of equipment, assume EL to be ten years. This represents a reasonable approximation of estimates obtained from IRS Asset Guideline Classes of industrial equipment for industries in Connecticut. Input the value of "Depreciable Life" (DL) as either 5 years (the period of time allowed by the Federal tax code for write-off of pollution equipment) or the Expected Life (EL) of the equipment, whichever is shorter.

** Although Connecticut's program does not automatically enter the value either of DL or of RI into the calculator, the program could be easily altered to do so.

- It automatically checks to make sure that:
    - The cost of capital is greater than the rate of inflation (CC > RI)
    - Both the cost of capital and the rate of inflation have been entered in decimal format.

  When either of these relations is faulty, the calculator will place a negative number in the window and will print no information until all input information is correctly entered.

- It calculates the values of (1+RI)/(1+CC), PVO, PVIE, PVE, A, and the civil assessment, CA. (For an explanation of the above variables and of the input variables, please refer to Part III, Chapter I, of this Volume.)

- Finally, the program prints out the variables used in the formula and CA, the monthly assessment liability incurred by a source for failure to comply.

To aid understanding of this Section, a diagram of a Wang keyboard is included on page V-175.

PROGRAMMING THE CALCULATOR

To place this program in the memory banks of the Wang, follow these steps:

(1) Start the calculator

(2) Press "Clear"

(3) Press "Learn Mode"

(4) Press "Prime"

The calculator is now ready to learn a program, and you may enter any program step by step. The diagram and tables that follow in Attachment A explain exactly what steps should be taken to enter the economic civil assessment program.

Once you have entered the program, you may place the program on tape:

(1) Press "Run Mode"

(2) Place the tape in the cassette holder (label out)

(3) Press "Rewind"

(4) Press "Tape Ready"

(5) Press "Record Prog" (record program)

Each such tape will serve as a portable "memory", obviating the need to enter the program manually in the future. Such tapes have already been prepared, and Phil Florkoski of the Air Compliance Unit, the person who did this programming work, will assist you in making whatever modifications become necessary.

After entering the program you can check that the program has been entered correctly by pressing "VERIFY PROG". The machine will total the code numbers of the steps you have entered and will flash the sum on the screen. The verification number for this program is 3446. If the calculator gives the right answer, you have probably entered the program correctly. You should still check that you have entered the steps in the correct order, however; the check described above will not pick up this mistake.

Note that if the program is changed, the verification number will also change. If the program is altered to input TC as 10 percent with the method suggested above, the code number of step 0118 will decrease by 3 (from 0003 to 0000) and the verification number will become 3443.

Three conventions have been used in this program:

- In some cases, one numerical operation (e.g. storing a particular variable) requires two steps. These two-step operations have been treated as one step. For example, storing a number in "Register 3" is done in two steps: (1) pressing the store key (ST on the keyboard) and (2) pressing the number of the register (03: one of the low order codes).
- The letters L or R appearing in the "Key" column refer to operations performed to the left and right registers, respectively. Step 0036, Total L means that you press the key "Total" on the left side of the keyboard, thus clearing the left register.
- Some steps are "upper-case" keys (e.g. the key "Mark"); to use them you must first press "Shift" on the left side of the keyboard. This step has not been included.

USING THE PROGRAM

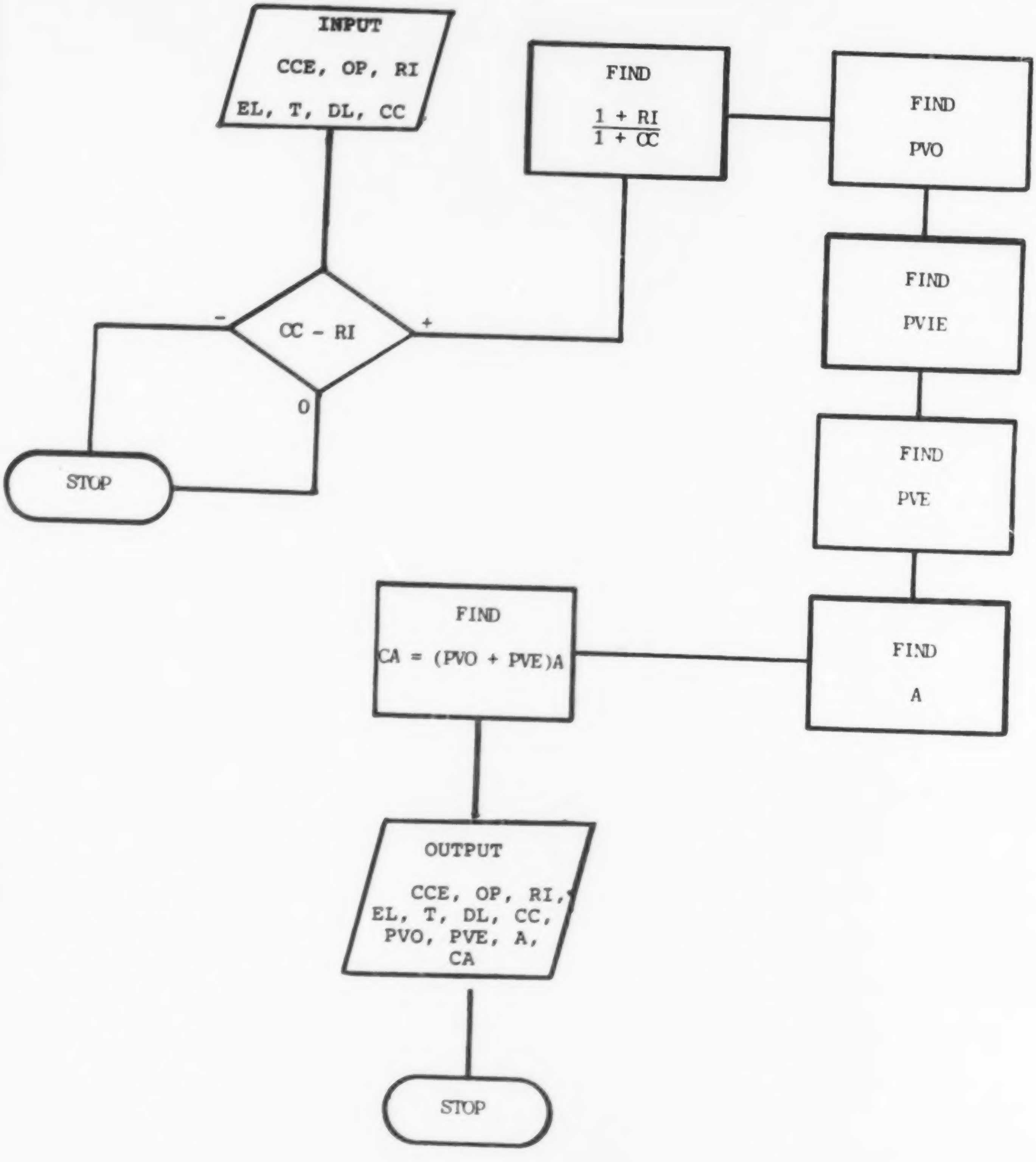
Given a tape of the economic civil assessment program, anyone can calculate assessments with ease. Attachment B provides a step-by-step description of how to do so.

To obtain the input variables you need for the program, refer to other sections of this Chapter. You will find a test of the needed variables in a sample worksheet attached at the end of the Attachment.

ATTACHMENT A

PROGRAMMING THE CALCULATOR

FLOW DIAGRAM FOR THE CIVIL ASSESSMENT CALCULATOR PROGRAM


INPUT
CCE, OP, RI
EL, T, DL, CC
CC - RI
-
+
0
STOP
FIND
1 + RI / 1 + CC
FIND
PVO
FIND
PVIE
FIND
PVE
FIND
A
FIND
CA = (PVO + PVE)A
OUTPUT
CCE, OP, RI,
EL, T, DL, CC,
PVO, PVE, A,
CA
STOP

I. Input Values and Perform Checks

Step*	Code**	Symbol***	Key****	Comment
0000	09 00	* M	Mark	Marks next entry as identification code
0001	08 12	* x^2	x^2	Identification code
0002	06 00	STO	ST	Store CCE in Register 00
0003	00 15	E15	CLD	Clear display
0004	09 03	* SP	Stop	Stop to enter data
0005	06 01	ST1	ST	Store OP in Register 01
0006	00 15	E15	CLD	Clear display
0007	09 03	* SP	Stop	Stop to enter data
0008	06 02	ST2	ST	Store RI in Register 02
0009	00 15	E15	CLD	Clear display
0010	09 03	* SP	Stop	Stop to enter data
0011	06 10	ST10	ST	Store EL in Register 10
0012	00 15	E15	CLD	Clear display
0013	09 03	* SP	Stop	Stop to enter data
0014	06 11	ST11	ST	Store T in Register 11
0015	00 12	E12	CHS	Change sign of T
0016	06 15	ST 15	Store L	Store - T in left register
0017	00 01	E1	1	
0018	02 15	+15	+L	Add 1 to - T
0019	06 12	ST12	ST	Store 1-T in Register 12
0020	01 15	T15	Total L	Clear left register
0021	00 15	E15	CLD	Clear display
0022	09 03	* SP	Stop	Stop to enter data

---

* The step number for each step of the program.

** The code number of each step (used in the User's Guide and in most cases, on the keyboard).

*** The symbol used in the Wang User's Guide for each step.

**** Keyboard symbol indicating which key is to be pressed when entering the program.

Step	Code	Symbol	Key	Comment
0023	06 13	ST 13	ST	Store DL in Register 13
0024	00 15	E15	CLD	Clear display
0025	09 03	*SP	STOP	Stop to enter data
0026	06 03	ST3	ST	Store CC in Register 03
0027	06 15	ST15	Store L	Store CC in left register
0028	07 02	RE2	RE	Recall RI
0029	03 15	-15	- L	Find CC - RI
0030	09 04	* J_0	Jif≠0	Skip next 2 steps if answer is not zero
0031	08 03	* Go	GO	
0032	09 03	* SP	Stop	Stop because CC cannot equal RI
0033	08 05	* J_+	Jif +	Skip next 2 steps if answer is positive
0034	08 03	* Go	GO	
0035	09 03	* SP	Stop	Stop because RI cannot be greater than CC
0036	01 15	T15	Total L	Clear left register
0037	07 03	RE3	RE	Recall CC
0038	06 15	ST15	Store L	Store CC in left register
0039	00 10	E10	.	
0040	00 09	E9	9	
0041	00 09	E9	9	
0042	03 15	-15	-L	Find CC - .99
0043	00 12	E12	CHS	Change sign
0044	06 15	ST15	Store L	Store - (CC - .99) in left register
0045	08 05	* J_+	Jif +	Skip next two steps if answer is positive
0046	08 03	* Go	GO	
0047	09 03	* SP	Stop	Stop because CC must be less than 1
0048	01 15	T15	Total L	Clear left register

II. Find Value of (1 + RI)/(1 + CC)

Step	Code		Symbol	Key	Comment
0049	00	01	E1	1	
0050	02	15	+15	+ L	
0051	07	02	RE 2	RE	Recall RI
0052	02	15	+15	+ L	Find 1 + RI
0053	06	15	ST15	Store L	Store 1 + RI in left register
0054	00	01	E1	1	
0055	02	14	+14	+ R	
0056	07	03	RE3	RE	Recall CC
0057	02	14	+14	+R	Find 1 + CC
0058	05	15	÷15	÷ L	Find (1 + RI) / (1 + CC)
0059	06	04	ST4	ST	Store (1 +RI) / (1 + CC) in Register 4

III. Find Value of PVO

Step	Code	Symbol	Key	Comment
0060	08 10	* LN	LOG_eX	Find natural log of (1 + RI) / (1 + CC)
0061	06 15	ST15	Store L	Store in left register
0062	00 02	E2	2	
0063	00 00	EO	0	
0064	04 15	x15	x L	Find 20 (LN (1 + RI) / (1 + CC))
0065	08 11	* e^x	e^x	Find $((1 + RI) / (1 + CC))^{20}$
0066	00 12	E12	CHS	Change sign
0067	06 15	ST15	Store L	
0068	00 01	E1	1	
0069	02 15	+15	+ L	Find $1 - ((1 + RI) / (1+CC))^{20}$
0070	01 14	T14	Total R	Clear right register
0071	00 01	E1	1	
0072	02 14	+14	+R	
0073	07 03	RE3	RE	Recall CC
0074	02 14	+14	+ R	Find 1 + CC
0075	04 15	x15	x L	Multiply left
0076	07 12	RE12	RE	Recall (1 - T)
0077	04 15	x15	x L	Multiply left
0078	06 15	ST15	Store L	Store value in left register
0079	01 14	T14	Total R	Clear right register
0080	07 03	RE3	RE	Recall CC
0081	06 14	ST14	Store R	Store CC in right register
0082	07 02	RE2	RE	Recall RI

Step	Code	Symbol	Key	Comment
0083	03 14	-14	- R	Find CC - RI
0084	08 15	* 1/x	1/x	Find 1 / (CC - RI)
0085	04 15	x15	x L	Multiply left
0086	06 15	ST15	Store L	
0087	07 01	RE1	RE	Recall OP
0088	04 15	x15	x L	Multiply left
0089	06 05	ST 5	ST	Store value of PVO in Register 05
0090	01 15	T15	Total L	Clear left register
0091	01 14	T14	Total R	Clear right register

IV. Find Value of PVIE

Step	Code	Symbol	Key	Comment
0092	00 01	E1	1	
0093	02 14	+14	+ R	
0094	07 03	RE3	RE	Recall CC
0095	02 14	+14	+ R	Find 1 + CC
0096	08 10	* LN	LOG_eX	Find LN (1 + CC)
0097	06 14	ST 14	Store R	
0098	07 13	RE13	RE	Recall DL
0099	04 14	x14	x R	Find DL (LN (1 + CC))
0100	08 11	* e^x	e^x	Find $(1 + CC)^{DL}$
0101	06 14	ST14	Store R	
0102	08 15	* 1/x	1/x	Find 1/ (1 + CC)
0103	00 12	E12	CHS	Change sign
0104	06 14	ST14	Store R	
0105	00 01	E1	1	
0106	02 14	+14	+R	Find 1 -(1/ $(1+CC)^{DL}$)
0107	07 11	RE11	RE	Recall T
0108	04 14	x14	x R	Multiply by T
0109	06 14	ST14	Store R	
0110	07 13	RE13	RE	Recall DL
0111	05 14	÷ 14	÷ R	Divide by DL
0112	07	RE3	RE	Recall CC
0113	05 14	÷ 14	÷ R	Divide by CC
0114	00 12	E12	CHS	Change sign
0115	06 14	ST14	Store R	
0116	00 10	E10	.	
0117	00 09	E9	9	

Step	Code		Symbol	Key	Comment
0118	00	03	E3	3	
0119	02	14	+14	+ R	Add .93
0120	06	14	ST14	Store R	
0121	07	00	REO	RE	Recall CCE
0122	04	14	x14	x R	Multiply by CCE
0123	06	06	ST6	ST	Store PVIE in Register 06
0124	01	15	T15	Total L	Clear left register
0125	01	14	T14	Total R	Clear right register

V. Find Value of PVE

Step	Code		Symbol	Key	Comment
0126	07	04	RE4	RE	Recall (1 + RI) / (1 + CC)
0127	06	14	ST14	Store R	
0128	08	10	* LN	LOG_eX	Find natural log
0129	06	14	ST14	Store R	
0130	00	02	E2	2	
0131	00	00	EO	O	
0132	04	14	x14	x R	Multiply by 20
0133	08	11	* e^x	e^x	Find $((1+RI) / (1 + CC))^{20}$
0134	00	12	E12	CHS	Change sign
0135	06	14	ST14	Store R	
0136	00	01	E1	1	
0137	02	14	+14	+ R	Add 1
0138	06	14	ST14	Store R	Store $1 + ((1+RI)/(1+CC))^{20}$ in right register
0139	07	04	RE4	RE	Recall (1+RI) / (1+CC)
0140	06	15	ST15	Store L	
0141	08	10	* LN	LOG_eX	Find natural log
0142	06	15	ST15	Store L	
0143	07	10	RE10	RE	Recall EL
0144	04	15	x15	x L	Multiply by EL
0145	08	11	* e^x	e^x	Find $((1+RI) / (1+CC))^{EL}$
0146	00	12	E12	CHS	Change sign
0147	06	15	ST15	Store L	
0148	00	01	E1	1	
0149	02	15	+15	+ R	Add 1

Step	Code	Symbol	Key	Comment
0150	05 14	÷14	÷ R	Divide left into right
0151	07 06	RE6	RE	Recall PVIE
0152	04 14	x14	x R	Multiply by PVIE
0153	06 07	ST7	ST	Store PVE in register 07
0154	01 14	T14	Total R	Clear right register
0155	01 15	T15	Total L	Clear left register

VI. Find Value of A

Step	Code		Symbol	Key	Comment
0156	07	03	RE3	RE	Recall RI
0157	06	14	ST14	Store R	
0158	00	01	E1	1	
0159	02	14	+14	+ R	
0160	06	14	ST14	Store R	Store 1 + RI in right register
0161	00	01	E1	1	
0162	00	10	E10	.	
0163	00	00	E0	0	
0164	06	15	ST15	Store L	
0165	00	01	E1	1	
0166	00	02	E2	2	
0167	00	10	E10	.	
0168	00	00	E0	0	
0169	05	15	÷15	÷ L	
0170	06	15	ST15	Store L	Store 1.0 / 12.0 in left register
0171	07	14	RE14	Recall R	Recall 1 + RI
0172	08	10	* LN	LOG_eX	Find natural log
0173	06	14	ST14	Store R	
0174	07	15	RE15	Recall L	
0175	04	14	x14	x R	Multiply by 1.0 / 12.0
0176	08	11	* e^x	e^x	Find $(1 + CC)^{(1/12)}$
0177	06	14	ST14	Store R	
0178	00	01	E1	1	
0179	03	14	-14	- R	Subtract 1
0180	06	14	ST14	Store R	Store $(1+CC)^{(1/12)} -1$ in right register

Step	Code		Symbol	Key	Comment
0181	01	15	T15	Total L	Clear left
0182	00	01	E1	1	
0183	00	10	E10	.	
0184	00	00	E0	0	
0185	06	15	ST15	Store L	
0186	07	03	RE3	RE	Recall CC
0187	02	15	+15	+ L	Find 1 + CC
0188	08	10	* LN	$\mathrm{LOG}_e X$	Find natural log
0189	06	15	ST15	Store L	
0190	00	02	E2	2	
0191	00	00	E0	0	
0192	04	15	x15	x L	Multiply by 20
0193	08	11	* e^x	e^x	Find $(1 + CC)^{20}$
0194	08	15	* 1/x	1/x	Find $1 / ((1 + CC)^{20})$
0195	00	12	E12	CHS	Change sign
0196	06	15	ST15	Store L	
0197	00	01	E1	1	
0198	02	15	+15	+ L	Find $1 - (1 / ((1+CC)^{20}))$
0199	05	14	÷14	÷ R	Divide right
02[illegible]	06	08	ST8	ST	Store A in Register 08
0201	01	15	T15	Total L	Clear left register
0202	01	14	T14	Total R	Clear right register

VII. Find Value of CA

Step	Code	Symbol	Key	Comment
0203	07 05	RE5	RE	Recall PVO
0204	06 15	ST15	Store L	
0205	07 07	RE7	RE	Recall PVE
0206	02 15	+15	+ L	Find PVO+PVE
0207	07 08	RE8	RE	Recall A
0208	04 15	x15	x L	Find (PVO + PVE) A
0209	06 09	ST 9	ST	Store CA in Register 09

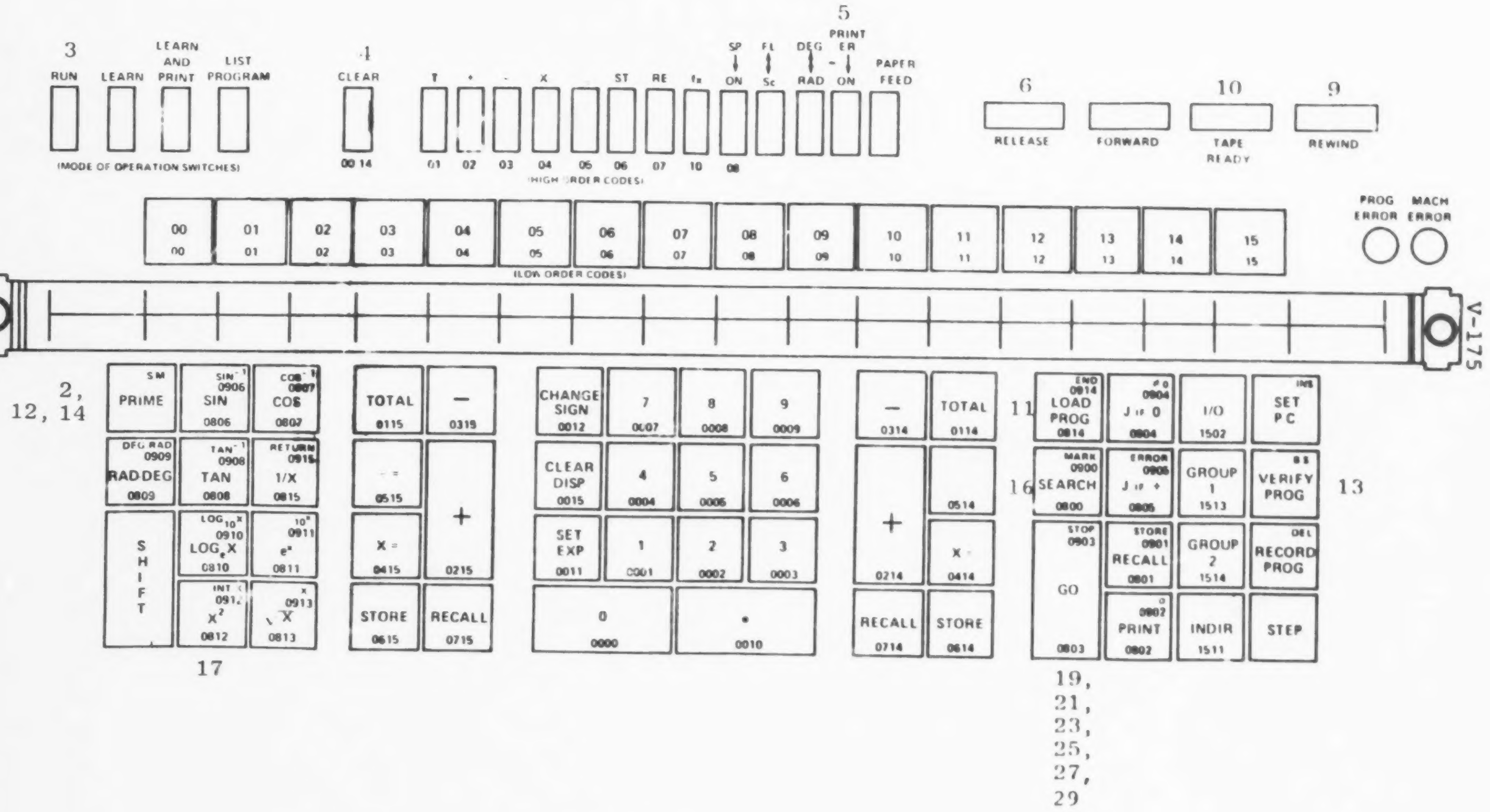
VIII. Print Out Values

Step	Code	Symbol	Key	Comment
0210	07 00	RE0	RE	Recall CCE
0211	08 02	* W	Print	
0212	07 02	RE2	RE	Print CCE with 2 decimal places, label E
0213	07 01	RE1	RE	Recall OC
0214	08 02	* W	Print	
0215	05 02	÷ 2	÷	Print OC with 2 decimal places, label C
0216	07 02	RE2	RE	Recall RI
0217	08 02	* W	Print	
0218	11 04	F4	-	Print RI with 4 places, label I
0219	07 10	RE10	RE	Recall EL
0220	08 02	* W	Print	
0221	14 02	C2	ST	Print EL with 2 places, label L
0222	07 11	RE11	RE	Recall T
0223	08 02	* W	Print	
0224	08 04	* Jo	04	Print T, 4 places, label F
0225	07 13	RE13	RE	Recall DL
0226	08 02	* W	Print	
0227	09 02	* 2	T	Print DL with 2 places, label G
0228	07 03	RE3	RE	Recall CC
0229	08 02	* W	Print	
0230	06 04	ST4	ST	Print CC, 4 places, label D
0231	08 02	* W	Print	
0232	00 15	E15	15	Space
0233	08 02	* W	Print	
0234	00 15	E15	15	Space
0235	07 05	RE5	RE	Recall PVO

Step	Code	Symbol	Key	Comment
0236	08 02	* W	Print	
0237	00 02	E2	02	Print PVO, 2 places, label X
0238	07 07	RE7	RE	Recall PVE
0239	08 02	* W	Print	
0240	01 02	T2	T	Print PVE, 2 places, label Y
0241	07 08	RE8	RE	Recall A
0242	08 02	* W	Print	
0243	02 06	+ 6	+	Print A, 6 places, label Z
0244	08 02	* W	Print	
0245	00 15	E15	15	Space
0246	08 02	* W	Print	
0247	00 15	E15	15	Space
0248	07 09	RE9	RE	Recall CA
0249	08 02	* W	Print	
0250	03 02	-2	-	Print CA, 2 places, label A
0251	09 03	* SP	Stop	Stop
0252	09 14	* EP	End Prog.	Program over

ATTACHMENT B

USING THE CALCULATOR


V-175
3
RUN
LEARN
LEARN AND PRINT
LIST PROGRAM
(MODE OF OPERATION SWITCHES)
4
CLEAR
00 14
T
+
-
X
ST
RE
fn
SP ON
FL Sc
DEG RAD
5
PRINTER - ON
PAPER FEED
01 02 03 04 05 06 07 10 08
(HIGH ORDER CODES)
6
RELEASE
FORWARD
10
TAPE READY
9
REWIND
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
(LOW ORDER CODES)
PROG ERROR
MACH ERROR
2, 12, 14
SM PRIME
SIN⁻¹ 0906 SIN 0806
COS⁻¹ 0907 COS 0807
DEG RAD 0909 RAD DEG 0809
TAN⁻¹ 0908 TAN 0808
RETURN 0915 1/X 0815
SHIFT
LOG₁₀X 0910 LOGₑX 0810
10ˣ 0911 eˣ 0811
INT 0912 X² 0812
0913 √X 0813
17
TOTAL 0115
— 0319
÷ = 0515
+ 0215
X = 0415
STORE 0615
RECALL 0715
CHANGE SIGN 0012
7 0007
8 0008
9 0009
CLEAR DISP 0015
4 0004
5 0005
6 0006
SET EXP 0011
1 0001
2 0002
3 0003
0 0000
• 0010
— 0314
TOTAL 0114
+ 0214
0514
X 0414
RECALL 0714
STORE 0614
11
END 0814 LOAD PROG 0814
≠0 0904 J if 0 0804
I/O 1502
INS SET PC
16
MARK 0900 SEARCH 0800
ERROR 0905 J if + 0805
GROUP 1 1513
BS VERIFY PROG
13
STOP 0903 GO 0803
STORE 0901 RECALL 0801
GROUP 2 1514
DEL RECORD PROG
0902 PRINT 0802
INDIR 1511
STEP
19, 21, 23, 25, 27, 29

STEP	OPERATION
1.	Turn machine ON
2.	Press "PRIME"
3.	Depress "RUN"
4.	Depress "CLEAR"
5.	Turn "PRINTER" on (switch in down position)
6.	Depress "RELEASE"
7.	Place tape in slot (label facing out)
8.	Close tape holder
9.	Press and hold "REWIND" until tape stops
10.	Depress "TAPE READY"
11.	Press "LOAD PROG"
12.	Press "PRIME"
13.	Press "VERIFY PROG". The number 3446 will appear. If the number does not appear, repeat steps 2 - 13.
14.	Press "PRIME"
15.	Enter Equipment Cost, left to right (e.g. 2 5 0 0 is 2500)
16.	Press "SEARCH"
17.	Press "X^2"
18.	Enter Operating Cost, left to right
19.	Press "GO"
20.	Enter Rate of Inflation in decimal left to right (e.g. . 1 0 is 0.10 = 10%)
21.	Press "GO"
22.	Enter Equipment Life left to right
23.	Press "GO"
24.	Enter Tax Rate in decimal left to right

STEP	OPERATION
25.	Press "GO"
26.	Enter Depreciation Life, left to right
27.	Press "GO"
28.	Enter Cost of Capital in decimal left to right
29.	Press "GO"

The input information will be printed out and labeled as follows:

INPUT INFORMATION	SAMPLE OF ACTUAL PRINTOUT	
Cost of Equipment	2500.00	E
Operating Cost	1000.00	C
Rate of Inflation	.1500	I
Expected Life	5.00	L
Tax Rate	.4800	F
Depreciation Life	5.00	G
Cost of Capital	.1200	D

The machine will then skip three lines and print out PVO, PVE and A and label the values as follows:

VALUE	SAMPLE OF ACTUAL PRINTOUT	
PVO	7152.21	X
PVE	4805.42	Y
A	.015719	Z

The machine will again skip three lines and print the civil assessment as shown below:

CIVIL ASSESSMENT	PRINTOUT	
	187.96	A

When you depress the button for "PAPER FEED" (next to "PRINTER") the tape will move up and the record of the calculation may be torn off.

To calculate a second civil penalty, repeat steps 14 to 23.

Turn the printer off by pressing the "PRINTER" switch.
Press "RELEASE", remove the tape and close the cassette unit.

COMPANY NAME:

______________________ ______________________

INPUT INFORMATION:

Cost of Equipment $____________ Operating Cost $____________

Rate of Inflation ____0.____ Equipment Life ________ Yrs.

Tax Rate ____0.____ Cost of Capital ____0.____

Depreciation Life ________Yrs.

PVO = Net present value of operating costs over assessment period, net of any tax savings arising from operating costs.

PVE = Net present value of equipment cost over entire assessment period. (Includes discounted value of initial and replacement equipment, less the value of tax credits and deductions and of any salvage value at the end of the assessment period.)

A = Amortization factor, giving amount of monthly payment required per dollar of present value to be amortized.

*Civil Assessment = (PVO + PVE) A

OUTPUT INFORMATION: ATTACH CALCULATOR TAPE

PVO ______________________

PVE ______________________

A ______________________

Civil Assessment per month

$______________________

*NOTE: See Part III, Chapter I for an explanation of these terms and the formula.

PART VI

REDUCING ADMINISTRATIVE COSTS WITH ECONOMIC CIVIL ASSESSMENTS

REDUCING ADMINISTRATIVE COSTS WITH ECONOMIC CIVIL ASSESSMENTS

INTRODUCTION

The Air Compliance civil assessment regulations (Sections 22a-6b-601 to 603) are designed to remove the entire economic benefit of not complying with Department standards. For the small number of cases where assessments may be necessary, these regulations will increase the work required from the Department staff. However, their major impact should be to cut the number of problem cases encountered by the Department, thus reducing the overall average cost per case significantly.

This Part describes and compares enforcement procedures and costs with and without economic civil assessments. It concludes that:

- If all potential polluters are warned before detection of their civil assessment liability for failure to comply:
    - Over 70 percent of those to whom the Department must now issue orders will comply voluntarily
    - Overall per case costs, including order issuance and follow-up, will drop by 43 percent.
- If the Department does not send warning letters or otherwise inform regulatees of their duty to comply and their potential liability for not doing so:
    - The caseload of the Air Compliance Unit should decline by 27 percent
    - Air Compliance administrative costs should drop by 24 percent per case.

This Part is divided into two chapters. Chapter I examines the impact Regulations 22a-6b-602 and 603 will have on the administrative costs of enforcement in the Air Compliance Unit. This chapter presents all the costs now associated with order issuance and follow-up and examines the effect of these regulations on existing procedures. Chapter II examines the impact Regulations 19-508-12(f) and 22a-6b-601 will have on the cost of progress report evaluation and enforcement. For convenience, the charts in Chapter I comparing current per-case costs and per-case costs under the civil assessment regulations include the results of the analysis contained in Chapter II. An Addendum explains the methodology underlying these cost estimates. It is followed by several appendixes with supporting data.

CAUTION

All the estimates of future administrative costs in this Part are subject to the following two reservations:

(1) The savings CEP anticipates will almost certainly not occur in the program's first year or two. It will take that time to demonstrate that the program works, to make sure regulatees know of it, and to get past initial "testing" by regulatees of just how far they can go in the face of this change.

(2) All the estimates assume that the Department's enforcement program does not change in other important respects. If the current high quality and adequate level of staffing is maintained; if the Department maintains a firm, unequivocal policy towards compliance; and if the standards it enforces are not changed; -- then these estimates will be reliable. If any of these factors changes, the Department's enforcement performance and costs would be importantly affected.

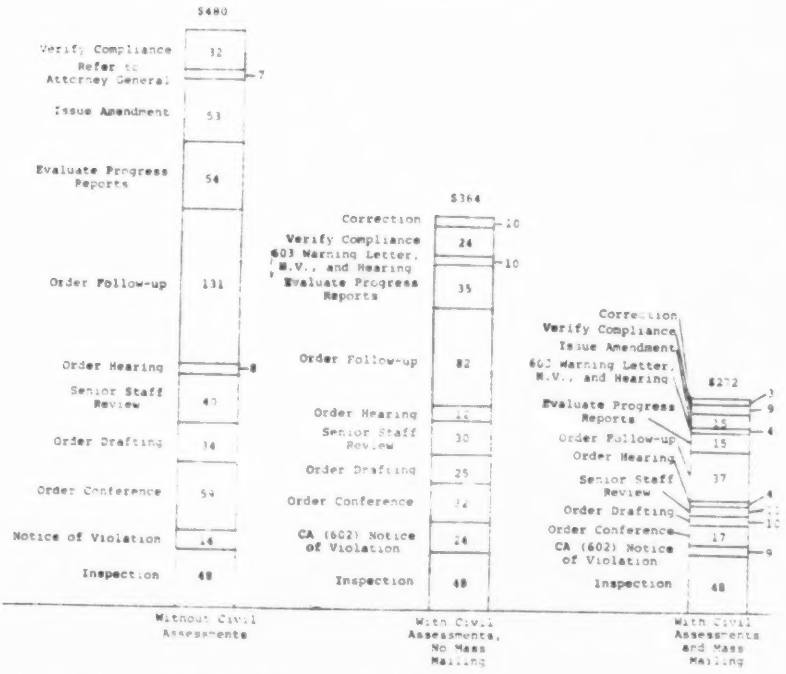
CHAPTER I

THE IMPACT OF EMISSIONS STANDARDS REGULATIONS ON ADMINISTRATIVE COSTS

Introducing economic civil assessments to enforce compliance with emissions standards and Department orders will reduce the administrative cost of enforcement by 24 to 43 percent. Much of this saving will come from increased voluntary compliance. How large the savings actually will prove to be depends chiefly on how much notice the Department gives those subject to its regulations of their potential liability.

The following chart summarizes where these savings can be expected (1) in the event that the Department takes no action to warn regulatees of their potential liability, or (2) if it sends warning letters to all regulatees.

Per Case Administrative Costs to DEP
Of Cases Presently Requiring Orders*



Source: Time logs maintained by Air Compliance staff 7/1/74 - 8/31/74; interviews with Air staff.

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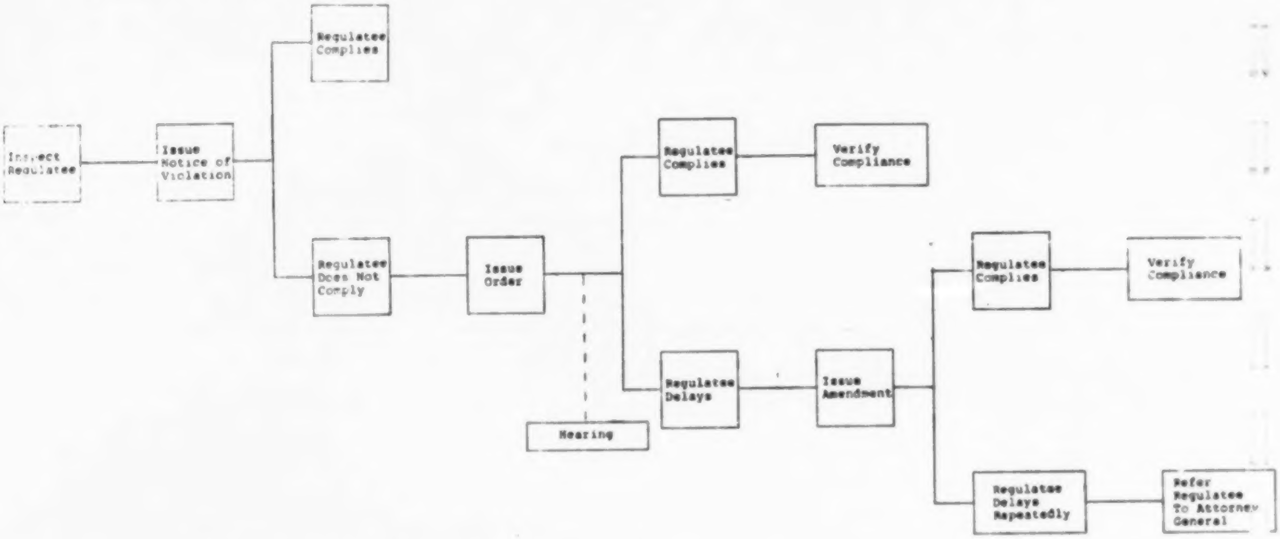
* Assumes that civil assessments will cause some sources to comply before detection, and that no additional sources will require orders.

This chapter quickly restates the chief reasons why the existing process is slow and expensive, summarizes how the 602/603 regulations would reduce these costs and outlines the added costs associated with using the new enforcement tools the regulations make available to the Department.

REDUCING CURRENT INFLATED COSTS

Regulatees with serious enforcement problems are typically issued first, notices of violation allowing them 30 days to come into compliance, then, after negotiations, legally binding orders. A simplified flow chart of this system follows.


Inspect Regulatee
Issue Notice of Violation
Regulatee Complies
Regulatee Does Not Comply
Issue Order
Hearing
Regulatee Complies
Verify Compliance
Regulatee Delays
Issue Amendment
Regulatee Complies
Verify Compliance
Regulatee Delays Repeatedly
Refer Regulatee To Attorney General

These procedures are now much more expensive than they need be. The Department must spend an enormous amount of staff time "keeping in touch with" and cajoling regulatees. It has no means of bringing the recalcitrant regulatee up short, of forcing an end to delay and footdragging. It can go to court, but that is itself such a slow and uncertain process that it is as likely to increase as to limit delay. In other words, the staff is forced to make a heavy investment of its time for want of an effective, credible, easily used enforcement tool.

The civil assessment regulations are designed to give the Department the tools it needs. They allow the Department to counterbalance entirely the (generally substantial) economic incentives that now discourage compliance. And they allow it to impose this incentive to comply quickly and at low cost. Much more important, the mere threat of invoking such tools should be fully effective -- and much more economical than actual imposition.

These tools will allow the Air Compliance Unit to cut enforcement costs substantially. Just how much will depend on several key variables:

- The increase in voluntary compliance, both before and after detection
- The expense of the new steps required for the imposition of assessments (e.g. the time required for the correction and mitigation of civil assessments) when this becomes necessary
- The extent to which regulatees will resort to administrative hearings and court appeals to avoid assessment liability.

VOLUNTARY COMPLIANCE

The most important of these variables is the first -- how large the increase in voluntary compliance will be. A CEP study of analogous enforcement situations found that the average improvement in voluntary compliance after the introduction of comparable improvements in enforcement was 72 percent.*

The actual improvement in voluntary compliance (and whether this improvement is higher or lower than the average experience) will depend importantly on the degree to which regulatees are made aware of their duty and of their potential liability to economic assessments.

(1) If the Department gives notice to all or most potential polluters, e.g. through a mailing to registered sources, it should detect many fewer emissions violations -- and therefore have to go through proportionately fewer order/enforcement proceedings. (Such a mailing would, however, entail some administrative and political cost.) Such notification would:

  - Force regulatees to take the Department's new enforcement tools into account when evaluating their response to regulation

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* A copy of this study is available from the Connecticut State Library, Hartford, Connecticut or from Mr. William Drayton, McKinsey and Company, 245 Park Avenue, New York, New York, 10017.

- Make regulatees financially liable to assessments fully equal to the economic benefit of noncompliance from the moment of notification. Without notification, regulatees (except for repeat offenders) are liable only after detection. (See Section 602(g)(4) in Part IV.)

- Suggest to regulatees that since the Department already knows of its existence, the probability of their being able to operate in violation and not be detected is very low.

Assuming that the Department notifies most potential regulatees, it is probably conservative to assume a 72 percent increase in voluntary compliance. A residual 28 percent of the current caseload would remain, persons who chose to ignore the warning, to take a chance on evading enforcement. In making it estimates of the cost savings that would result from the introduction of civil assessments, the CEP assumed that this 28 percent, once detected and brought under order, would not be more cooperative than they now are and that, consequently, the per-case administrative cost imposed by this group would remain unchanged. This is unlikely. Once presented with a powerful economic incentive not to fall behind on their order schedules, they will very probably be much less likely to delay than they now are. Again, CEP preferred to make exceptionally cautious, conservative assumptions.

(2) If the Department does not inform regulatees of their potential civil assessment liability, it will still experience some improvement in voluntary compliance. Even for those regulatees that do not become aware of the regulations until they are notified by the Department that they are in violation, the fact that they are also thenceforth liable to assessment is very likely to sharply curtail subsequent delay in agreeing to and complying with Department orders. Those with sufficient previous contact with the Department to be liable for assessment prior to such formal notice and who become aware of their potential liability are also very likely to comply voluntarily before any Department action.

- Regulatees unaware of the regulations prior to detection will reduce subsequent compliance delays by a minimum of 22 percent. This estimate assumes that only 30 percent of such delay is avoidable, the lowest figure the Air Compliance staff felt possible. (Staff "best guess" estimates were between 60 and 70 percent.) If those under order, all of whom have full notice of their liability to civil assessment in the event of delay, respond to such liability as much as others facing similar improvements in enforcement have, 72 percent of this 30 percent of all order delay -- i.e. 22 percent -- will no longer occur.

- Roughly 37 percent of the 4000 sources that have been inspected up to May, 1974, were issued notices of violation and/or orders. All such documents now automatically include a civil assessment warning. Consequently, even without an immediate mass mailing, the Department can assume several years hence that 37 percent of sources sufficiently important or troublesome to require inspections will both (1) be aware of their potential liability and (2) be liable in the event of a violation from the time the violation began rather than from the time Department detection triggered a formal notice. If 72 percent of such sources respond to their new situation by complying voluntarily, the Department's caseload will drop by 27 percent.

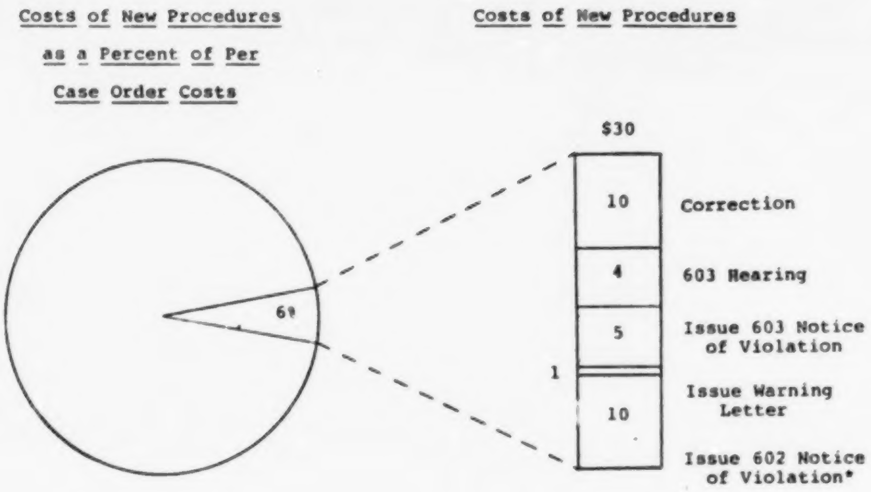
If the Department warns regulatees in advance, it should experience at least a 43 percent cut in administrative costs. Even if it does not give notice, it should benefit from a 24 percent savings.

ADDED COSTS

Using these new tools will entail some partially offsetting additional costs as well: several new steps and the risk of an increase in the number of orders that are contested. These costs are, however, small.

The Costs Of New Steps

Imposing and administering either Section 602 or 603 civil assessments entails some added cost, roughly $30 per case.



Costs of New Procedures as a Percent of Per Case Order Costs

Costs of New Procedures

Source: Time logs maintained by Air Compliance Staff 7/1/74-8/31/74, interviews with Air Staff

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* Includes only incremental costs of Civil Assessment Notice of Violation, not costs of issuing non-CA Notice

Compared to average savings from increased voluntary compliance of from $116 to $208 per order, these costs are well worth incurring.

Most of this new expense will involve responding to regulatees' reactions to assessments. Two-thirds of this expense will flow from two steps -- holding administrative hearings in response to regulatee challenges (1) to the imposition of civil assessments (civil assessment hearings) and (2) regarding the size of the final civil assessment (correction hearings).

Civil Assessment Hearings

Those in receipt of a notice of violation for violation of an emissions standard can contest the existence of a violation or the size of the assessment. However, regulatees will find it hard to contest either issue. It is usually difficult to contest the result of emissions tests conducted by Department engineers (to date only three percent of all order recipients have contested any aspect of their orders), and 602/603 regulations allow the Department to defer hearings regarding the amount of the assessment, if it lacks complete information, until the source has come into compliance. As a result, a source will have little to gain by bringing this issue up until then. Moreover, the fact that the Commissioner is more likely to mitigate assessments when sources comply quickly is very likely to encourage regulatees to comply quickly.

Those assessed for violating the terms of an order can contest the fact of violation (in this case, whether the regulatee has met the terms of an order) and whether the assessment amount is correct. Both issues will be very difficult to contest successfully. If equipment is not in place by a specific date, it will be hard to claim it was. Although the correct assessment amount can be challenged more easily, any hearing on this subject can be deferred until after the regulatee has come into compliance.

Correction Hearing

Some regulatees may feel that they need a formal hearing on the size of their assessment if informal correction negotiations prove to be unsatisfactory. Several considerations suggest that there will be very few correction hearings a year:

* Few regulatees who receive only a 602 assessment will ask for correction. In virtually all cases, the 602 assessment will be mitigated if a regulatee promptly moves to comply and agrees to the terms of an order. Moreover, regulatees that demonstrate good faith by complying with the terms of their order have created an additional basis for mitigation. In these cases, regulatees will owe only a fraction of any initial 602 liability and will have no grounds on which to ask for correction.

* Correction hearings on 603 assessments (or on combined 602-603 assessments) will also be rare. Because most regulatees should either comply before detection or will succeed in eliminating avoidable delay after detection, probably no more than ten cases a year should require 603 assessments. CEP has assumed that most of these will request assessment correction, but that informal evaluation of mitigating circumstances should satisfy most such regulatees.

Increase In Costs Of Old Steps

Because regulatees may ask for order hearings more frequently than in the past, it is possible that per-case costs of this step will increase.

Regulatees will have more of an incentive to ask for order hearings. Section 603 makes accepting and then falling behind the deadlines of an order financially risky. However, as long as an order is not final, there are no enforceable deadlines to miss and hence no risk.

Two considerations suggest that the rate of order hearings will continue to be low.

* Many sources will prefer to accept an order so as to avoid 22a-6b-602 liability.

* A regulatee will only gain by asking for an order hearing if such an action will result in a stay of the penalty. If only the collection, not the assessment, is stayed, then the amount of money owed by the source continues to mount as long as it delays (unless it wins the appeal).

CHAPTER II

THE IMPACT OF THE PROGRESS REPORT REGULATIONS ON ADMINISTRATIVE COSTS

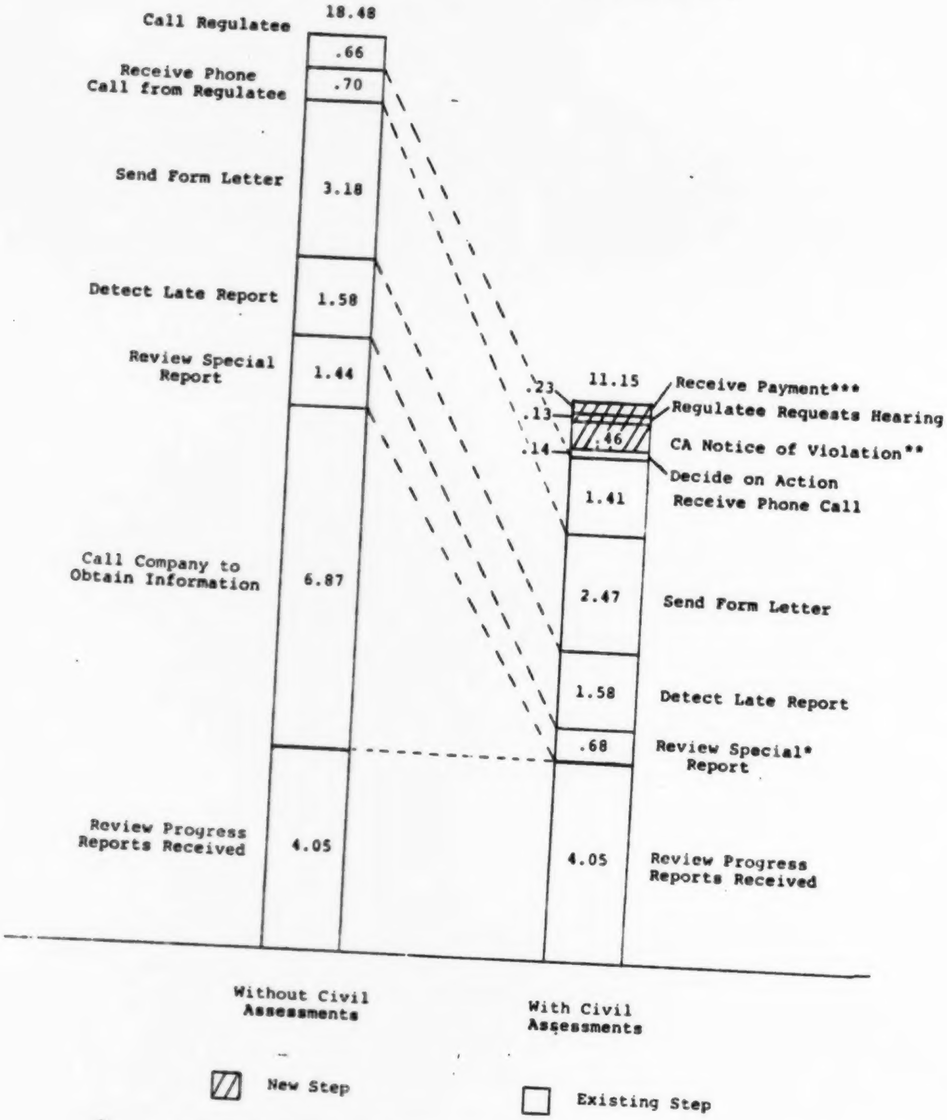
This chapter analyzes the effect of Sections 19-508-12(f) and 22a-6b-601 of the Civil Assessment Regulations on the cost and effectiveness of progress report procedures.

Progress reports are usually required monthly from regulatees under order. They enable the Department to keep informed about regulatees' progress toward compliance without having to conduct frequent, expensive field inspections.

Section 19-508-12(f), an amendment to Air Compliance emissions regulations, defines standards for the timing and content of progress report submission; Section 22a-6b-601 imposes financial liabilities for failure to meet these requirements. These regulations should cut current delinquency rates several hundred percent -- and reduce the cost of administering the progress report portion of the enforcement process at the same time.

CEP estimates that the new progress report regulations will cut the costs of progress report enforcement by 40 percent, from $18.48 to $11.15 for the average order.

Per Order Costs of Progress Report Enforcement



Source: Interviews with Air Compliance staff.

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* This step has been moved from its proper place in the flow to facilitate comparison to the costs of the system without civil assessments. It properly follows the step "Send Form Letter".

** Includes receiving phone call from regulatee.

*** Includes sending reminder letter to regulatee.

The regulations will achieve this effect by cutting (1) the number of missing (or seriously late) progress reports from 1.5 to .4 per order (a 72 percent cut) and (2) the number of incomplete reports submitted from 2.25 to 1 per order (55 percent).

COMPARING THE EXISTING PROGRAM AND THE CIVIL ASSESSMENT PROGRAM

The Air Compliance Unit now uses separate procedures for incomplete and overdue progress reports. If a progress report is incomplete (as are 25 percent of all reports submitted), a Department staff member calls the delinquent regulatee and requests it to complete its report. If a progress report is two weeks overdue (17 percent of all reports), a Department staff member sends a "reminder letter." These procedures comprise a substantial portion -- 33 percent -- of DEP staff costs for progress report evaluation (though this represents only 4 percent of DEP costs for an order recipient).

The civil assessment system streamlines these procedures so that either violation is greeted by a form warning letter notifying the regulatee of its potential liability for noncompliance. As the chart on the previous page indicates, the chief reason for the $7.33 drop in per-order costs is the elimination of the need to call the regulatee.

Though CEP's study of four other enforcement settings indicates that these new enforcement tools will increase voluntary compliance by 72 percent, this is probably a much too conservative estimate in this situation:

* A somewhat higher percentage of DEP regulatees than regulatees in the other systems studied will be aware of liability for failure to submit progress reports; all those required to submit reports will know of their obligation (and potential liability) upon receipt of their order. (A special mailing has been sent to all those with outstanding orders.)

* The probability of detection is 100 percent, again, somewhat higher than in the other enforcement settings examined.

Similarly, the number of incomplete reports may very well decrease more than 55 percent: this estimate assumes regulatees will send in incomplete reports on the average of once per order. This is a very cautious assumption. Section 19-508-12(f) identifies what is required clearly and at length.

In theory, every assessment could be contested, a frighteningly expensive prospect. However, such contests will in fact be rare. Most regulatees will require no more than the warning letter, so there will be few assessments to contest. And such assessments are less likely to be contested than parking tickets.

Not only are these $50 and $100 assessments insignificant costs to most DEP regulatees, they are much smaller than the cost to the regulatee of a contest. Moreover, it will be almost impossible to contest violations as clearly defined as missing a progress report deadline successfully. In any case, such hearings are likely to be short and could be scheduled along with other hearings. CEP estimates that such contests will add considerably less than 1 percent to the per-order cost of enforcement.

ADDENDUM

METHODOLOGY AND SUPPORT INFORMATION

This Addendum describes how the administrative costs estimates used in the last two chapters were obtained. It begins with a brief explanation of the methodology used to calculate the costs of each step. Then, for Chapter I, a summary of the costs and person-hours of each step involved in existing enforcement procedures is provided, followed by a flow chart of the proposed civil assessment procedures and a sample calculation of the costs of enforcement procedures with civil assessments. The back-up information for Chapter II includes a step-by-step description of enforcement procedures with and without civil assessments.

METHODOLOGY

The CEP study of administrative costs for the Air Compliance Unit is based on information gathered from Air Compliance staff time logs maintained from 7/1/74 to 8/31/74 and from numerous interviews with members of the Air Compliance staff. Staff members were asked to described in detail what takes place after a violation is detected: what steps are taken, who takes them, how long they take, and in what percentage of cases they are taken. Combining this information with the salaries paid Department staff members (adjusted for fringe benefits and indirect costs), the CEP staff calculated the average cost of each step and the average cost for each case. Calculations of the time that elapses between various steps in the enforcement process are based both on a study of Air Compliance files and upon interviews with Air staff.

CEP estimated the impact of civil assessment tools on regulatee behavior and on enforcement costs stem in two major steps:

(1) Using a study of improvements in analogous regulatory situations after enforcement was strengthened, CEP estimated how much likely improvements in voluntary compliance would affect the average cost of the steps in the enforcement process. (Voluntary compliance would increase roughly 70 percent depending chiefly on how much notice regulatees were given, and those that still require orders will reduce avoidable delay a like amount. A sample of one of these calculations is included in Attachment C.)

(2) CEP analyzed what new steps will be needed and how much they are likely to cost. Cost estimates were made by analogy to similar steps or portions of steps in the existing enforcement process.

CAUTIONS

These cost estimates are only estimates of the average case. Enforcement procedures will differ somewhat even when the cases are similar. Moreover, the difficulty of individual cases and the attitude of different regulatees vary dramatically -- requiring the Department to allocate similarly varying amounts of the time of different staff members to different cases. Moreover, these cost estimates assume the Department's policies and the quality and adequacy of its enforcement staff remain unchanged. Given these last assumptions, the estimates should be reliable once the Department has fully implemented economic civil assessments and once the public has become familiar with them.

ATTACHMENT A

EXISTING ENFORCEMENT
PROCESS ADMINISTRATIVE COSTS

EXISTING ENFORCEMENT PROCESS ADMINISTRATIVE COSTS

	Send Out Pre-Inspection Questionaire	Follow Up on PIQ If Necessary - add'l mailing - phone calls	Evaluate PIQ - check trouble spots	Schedule Inspection	Hold Inspection	Report Results of Investigation - Inspector's report - Log results
Staff Time (In Min)						
Comm.						
Dep. Comm.						
Dir.						
Ass't Dir.						
Prin. Eng.						
Sr. Eng.	10	10	25			
Eng				15		5
Eng Int					150	40
Cler	25	10		10		
(In Hrs.) TOTAL TIME	1/2	1/3	1/2	1/3	2-1/2	3/4
TOTAL AMOUNT	$4.66	$2.66	$5.13	$3.55	$20.68	$7.00

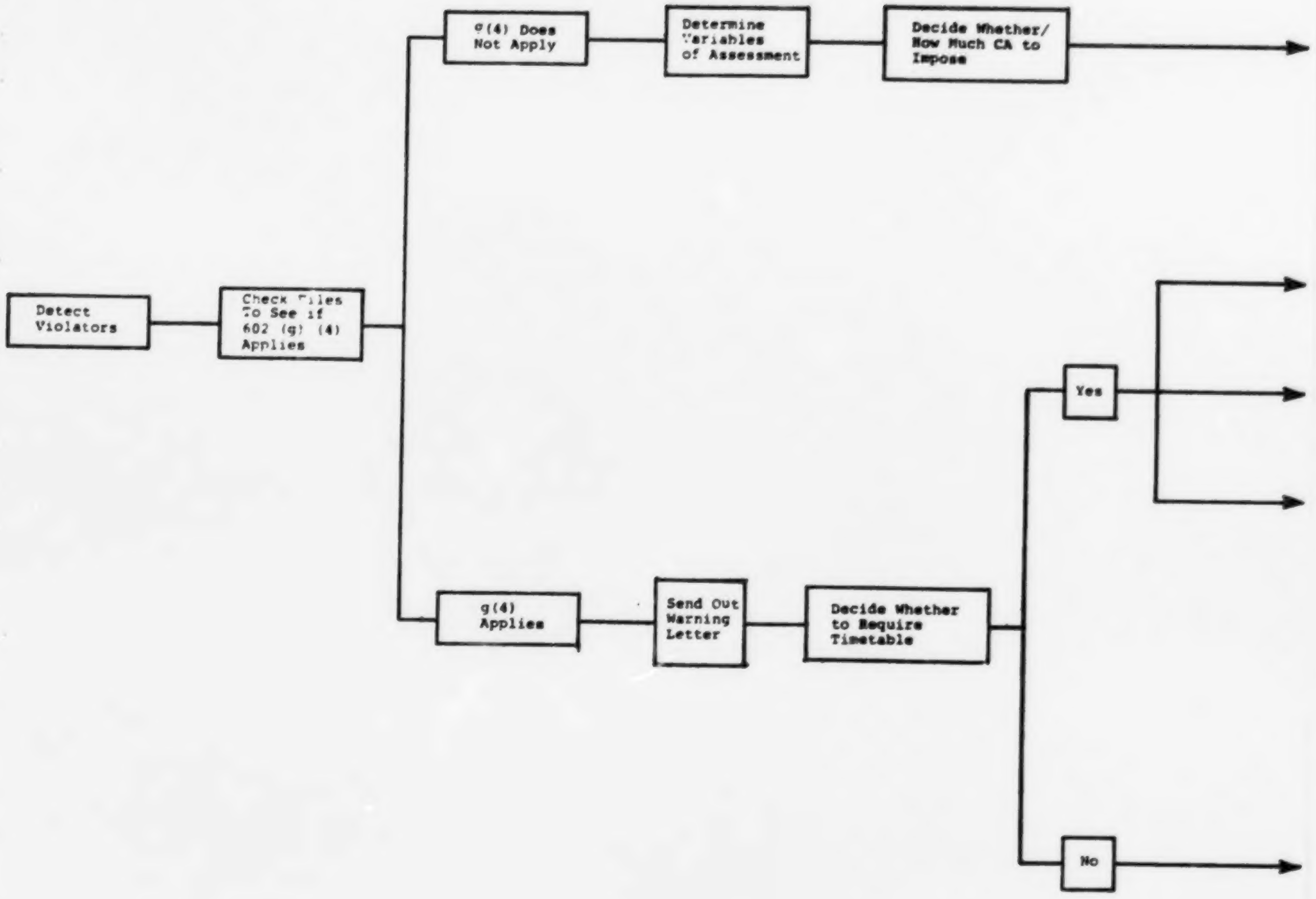
Sources: Interviews with staff; administrative time logs.

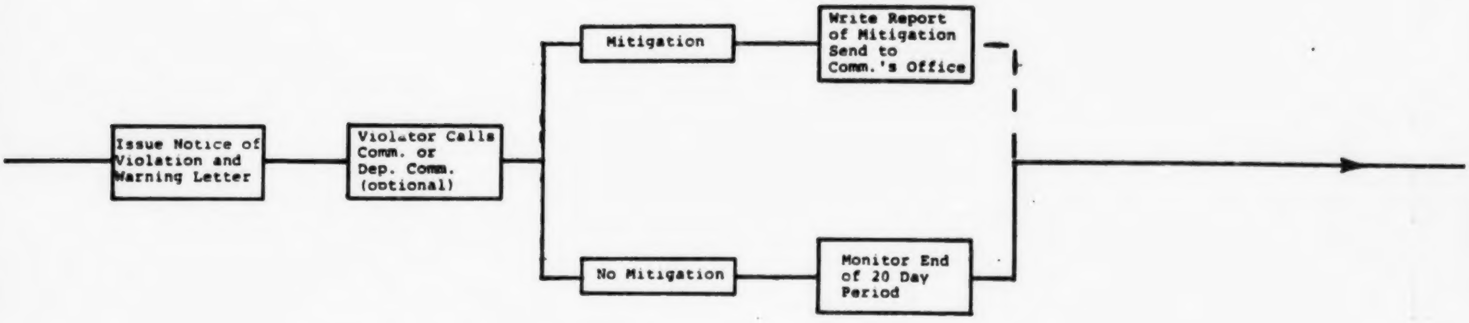
Staff Time (In Min)	Evaluate Inspection Report -Check Report	Send Out Notice of Violation -Follow Up	Hold Conference - Arrange - Discuss Timetable	Draft Order
Comm.				
Dep. Comm.				
Dir.				
Ass't Dir.		5		
Prin. Eng.	20		105	85
Sr. Eng.		40	105	25
Eng		5		5
Eng Int			60	
Cler		30		60
(In Hrs.) TOTAL TIME	1/3	2/3	4	3
TOTAL AMOUNT	$4.95	$13.61	$59.03	$34.18

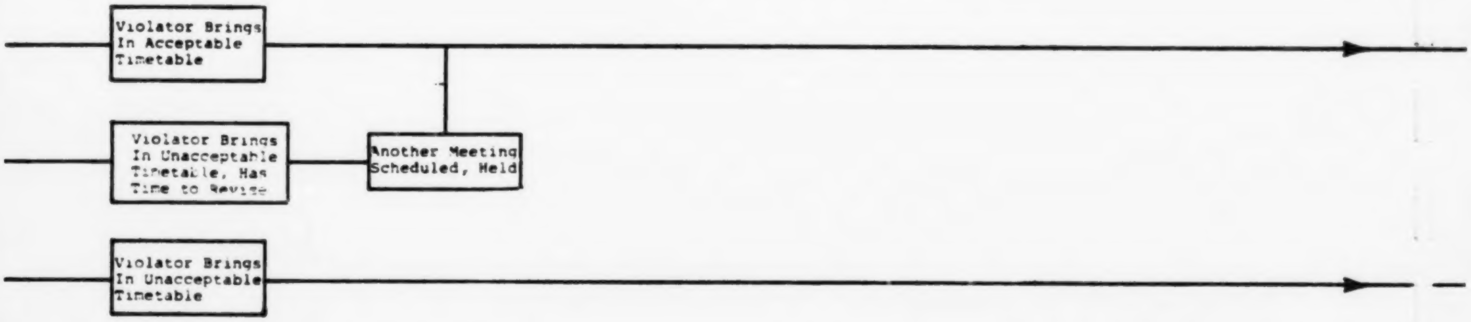
Staff Time (In Min)	Staff Reviews Order	Sent Out Order	Follow Up Order	Evaluate Progress Reports	Issue Amendment To Order	Verify Compliance	Order Hearing 3% Frequency	Refer Case To Attorney General 5% Frequency
Comm.								
Dep. Comm.	15				5			30
Dir.	20				5		240	45
Ass't Dir.	45				10		240	45
Prin. Eng.			320		150	10	165	325
Sr. Eng.			95		150	10	165	100
Eng	15	10	250	375	5	10		
Eng Int						190		
Cler		35			25		510	150
(In Hrs.) TOTAL TIME	2	3/4	11.11	6.25	5.7	3.7	22	12-1/4
TOTAL AMOUNT	$34.89	$5.37	$131.40	$54.06	$52.63	$31.87	$260.00	$143.01

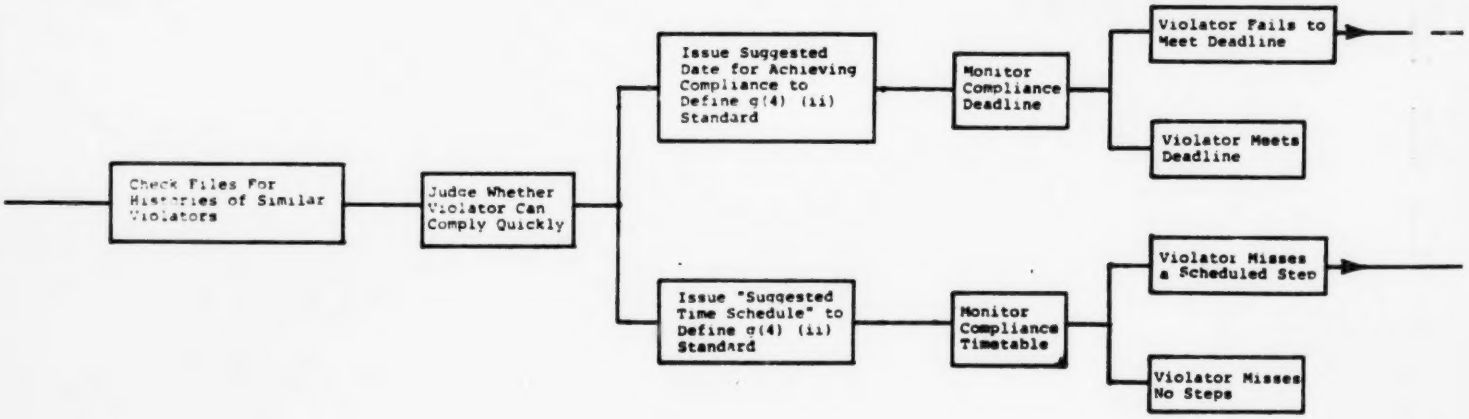
ATTACHMENT B

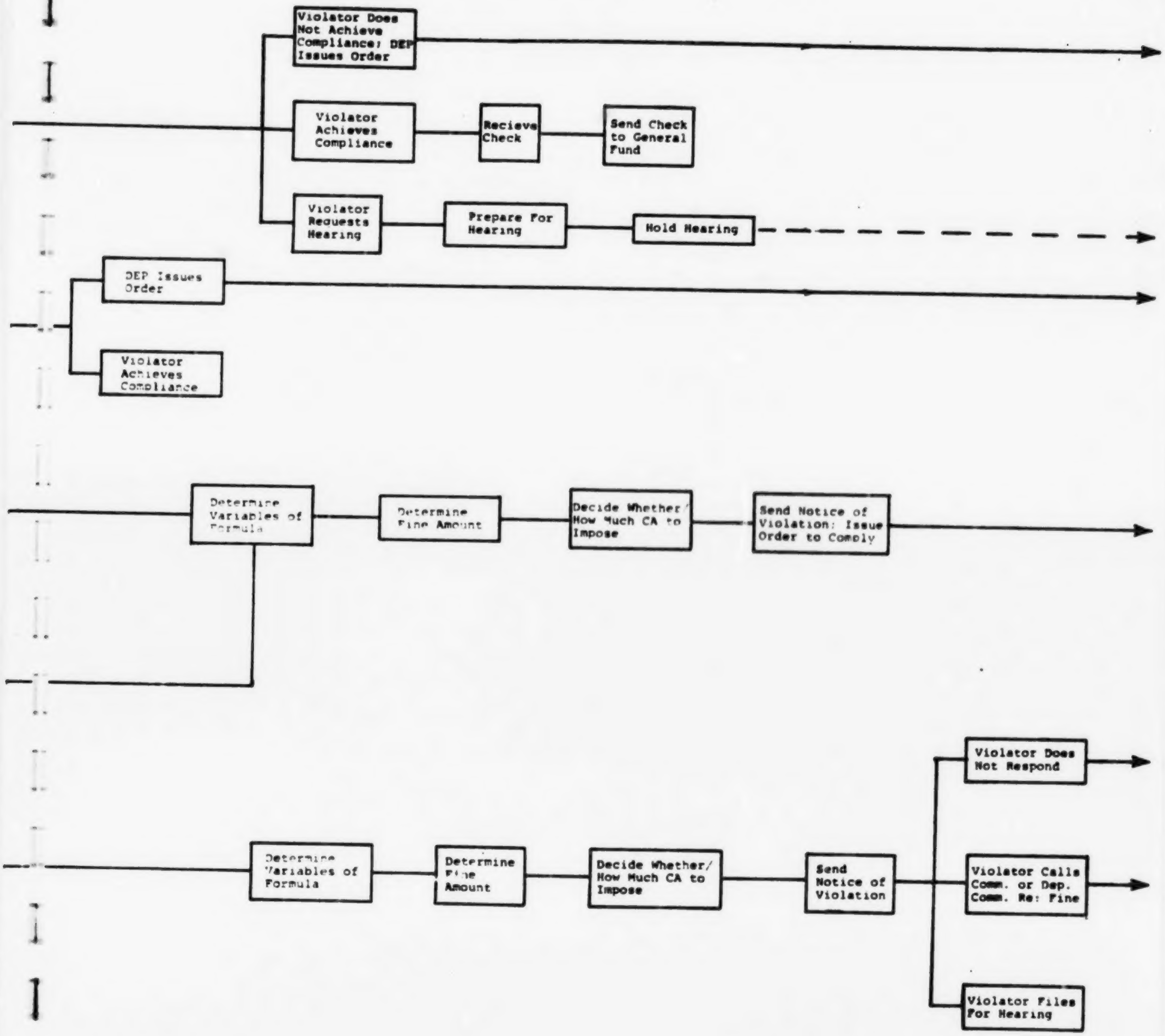
THE CIVIL ASSESSMENT SYSTEM

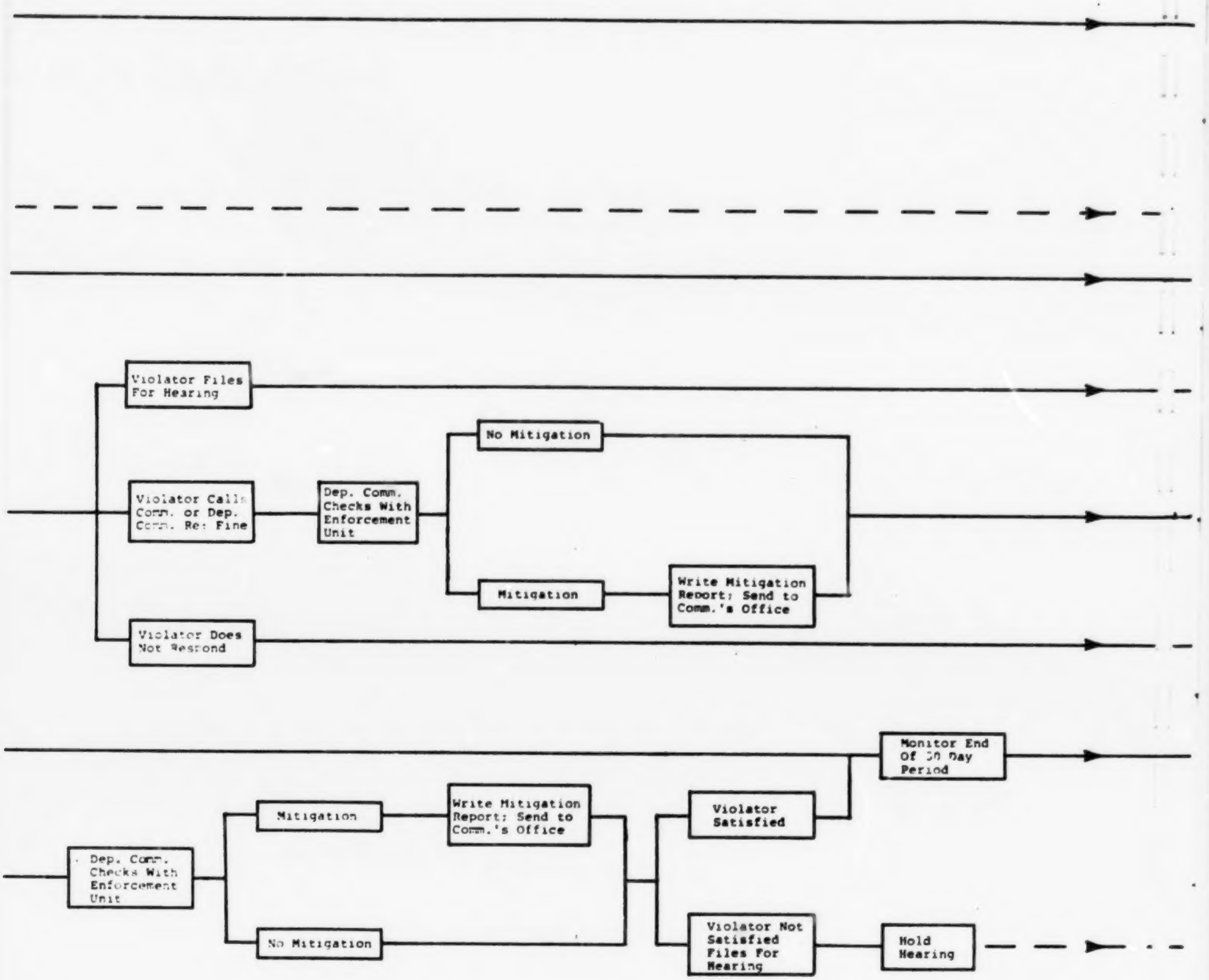

Detect Violators
Check Files To See if 602 (g) (4) Applies
g(4) Does Not Apply
Determine Variables of Assessment
Decide Whether/ How Much CA to Impose
g(4) Applies
Send Out Warning Letter
Decide Whether to Require Timetable
Yes
No

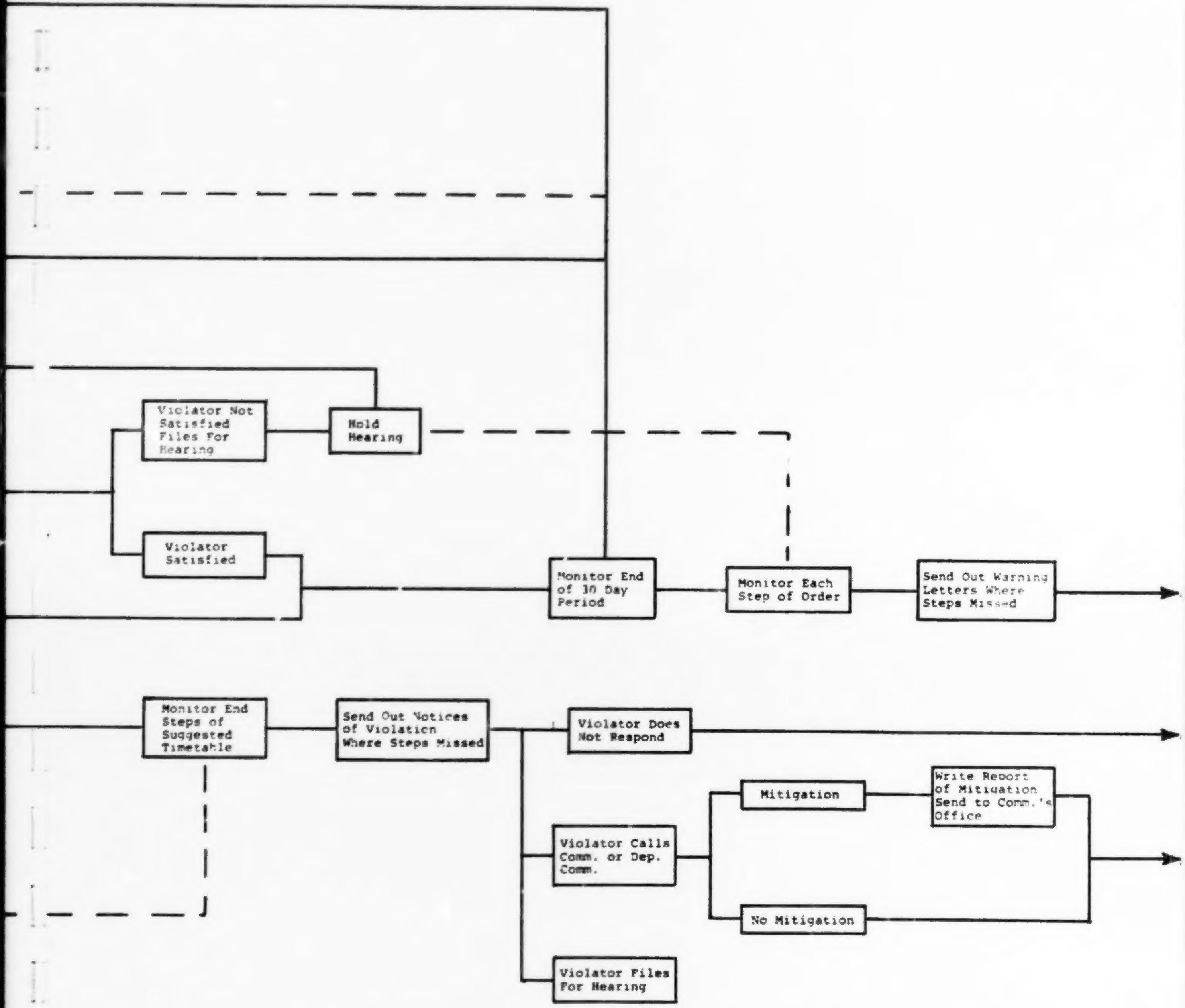

Issue Notice of Violation and Warning Letter
Violator Calls Comm. or Dep. Comm. (optional)
Mitigation
Write Report of Mitigation Send to Comm.'s Office
No Mitigation
Monitor End of 20 Day Period

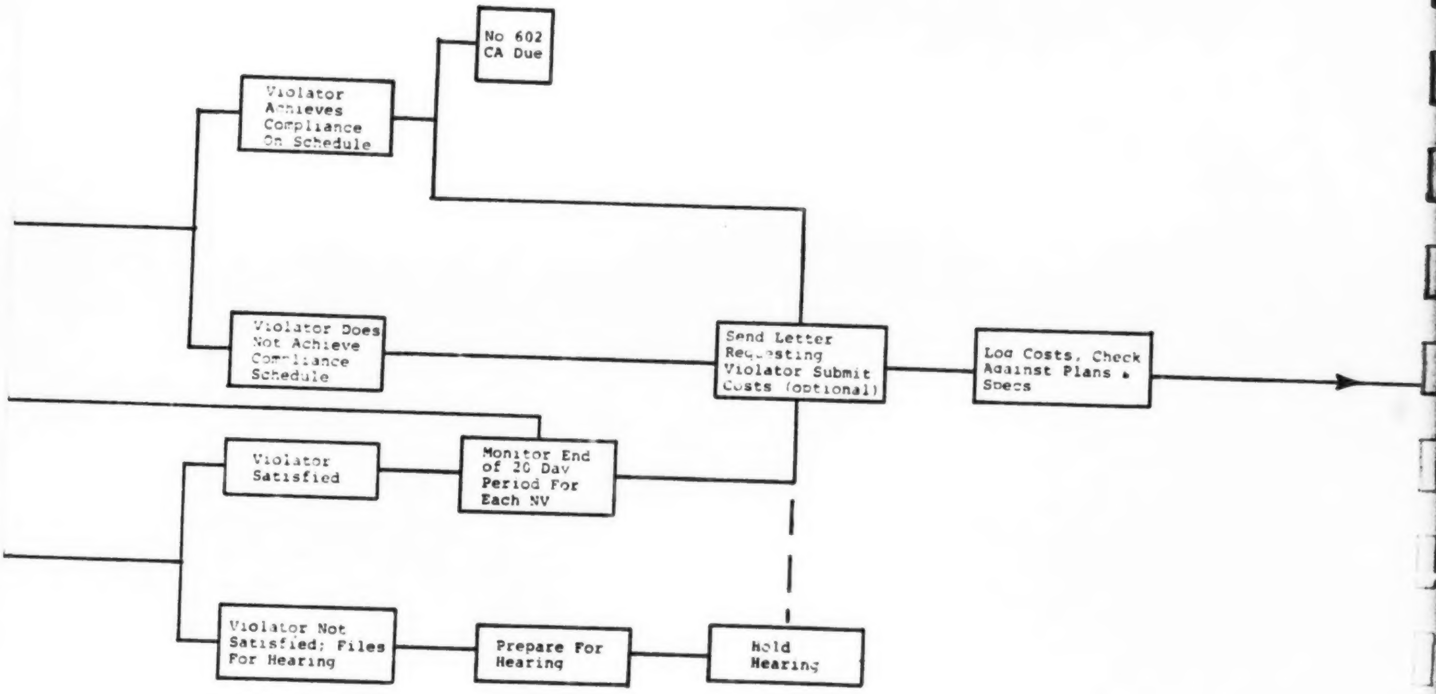

Violator Brings In Acceptable Timetable
Violator Brings In Unacceptable Timetable, Has Time to Revise
Another Meeting Scheduled, Held
Violator Brings In Unacceptable Timetable

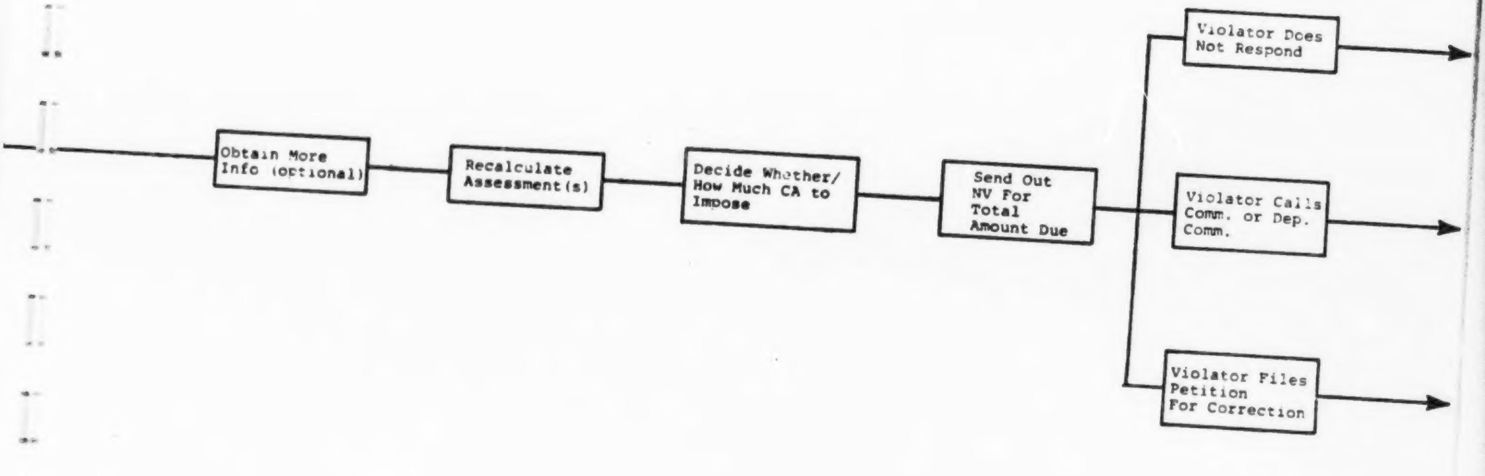

Check Files For Histories of Similar Violators
Judge Whether Violator Can Comply Quickly
Issue Suggested Date for Achieving Compliance to Define g(4) (ii) Standard
Monitor Compliance Deadline
Violator Fails to Meet Deadline
Violator Meets Deadline
Issue "Suggested Time Schedule" to Define g(4) (ii) Standard
Monitor Compliance Timetable
Violator Misses a Scheduled Step
Violator Misses No Steps

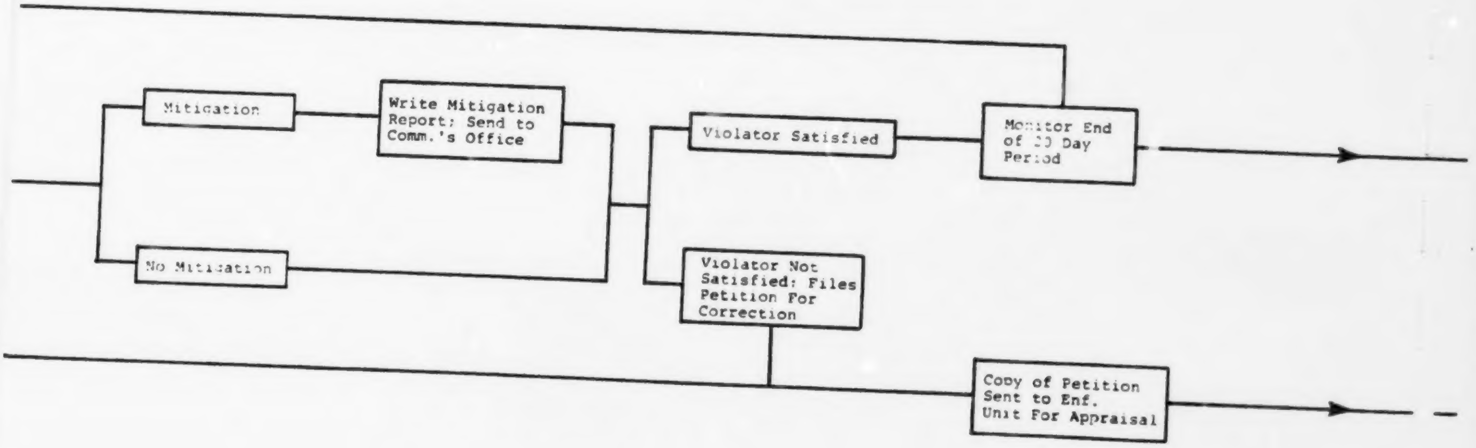

Violator Does Not Achieve Compliance; DEP Issues Order
Violator Achieves Compliance
Recieve Check
Send Check to General Fund
Violator Requests Hearing
Prepare For Hearing
Hold Hearing
DEP Issues Order
Violator Achieves Compliance
Determine Variables of Formula
Determine Fine Amount
Decide Whether/ How Much CA to Impose
Send Notice of Violation; Issue Order to Comply
Determine Variables of Formula
Determine Fine Amount
Decide Whether/ How Much CA to Impose
Send Notice of Violation
Violator Does Not Respond
Violator Calls Comm. or Dep. Comm. Re: Fine
Violator Files For Hearing

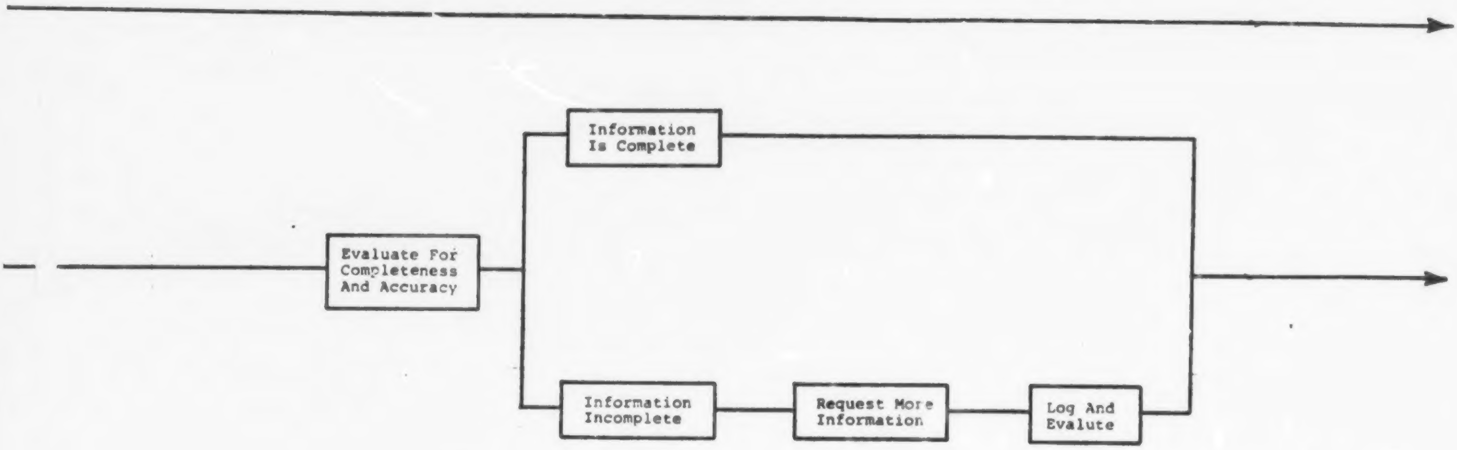

Violator Files For Hearing
Violator Calls Comm. or Dep. Comm. Re: Fine
Dep. Comm. Checks With Enforcement Unit
No Mitigation
Mitigation
Write Mitigation Report; Send to Comm.'s Office
Violator Does Not Respond
Monitor End Of 30 Day Period
Dep. Comm. Checks With Enforcement Unit
Mitigation
Write Mitigation Report; Send to Comm.'s Office
No Mitigation
Violator Satisfied
Violator Not Satisfied Files For Hearing
Hold Hearing

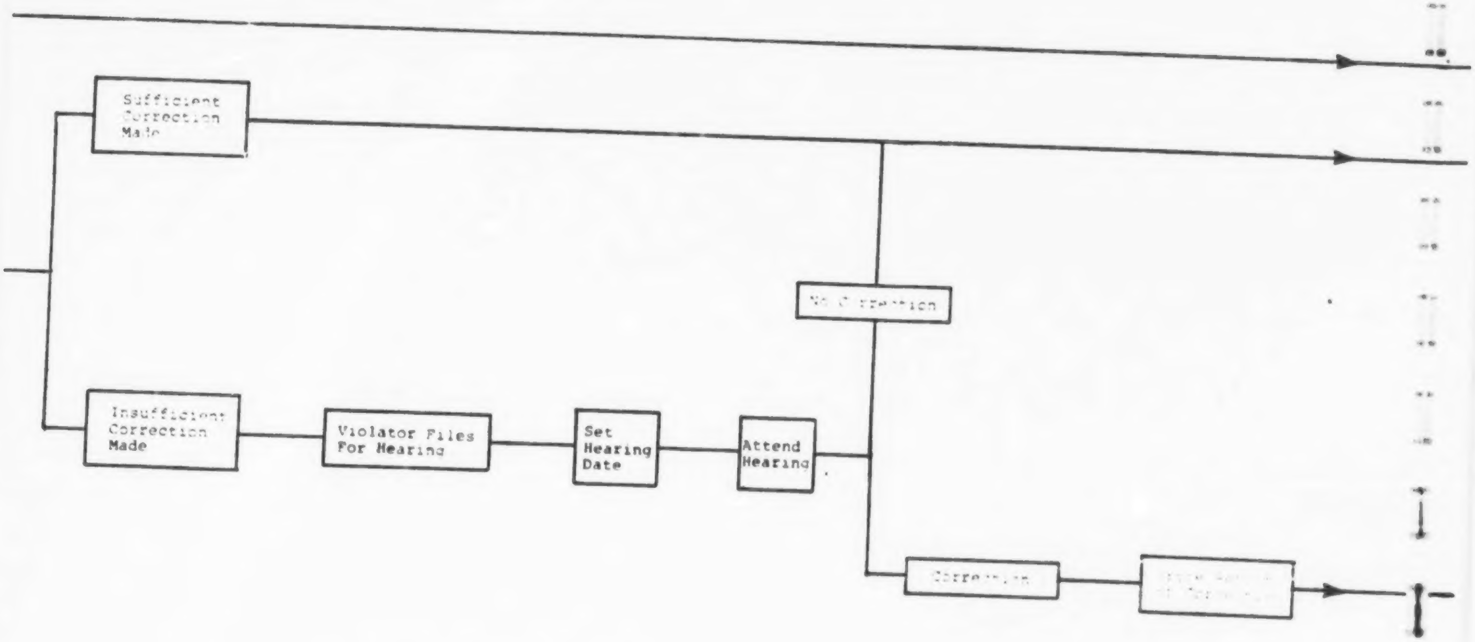

Violator Not Satisfied Files For Hearing
Hold Hearing
Violator Satisfied
Monitor End of 30 Day Period
Monitor Each Step of Order
Send Out Warning Letters Where Steps Missed
Monitor End Steps of Suggested Timetable
Send Out Notices of Violation Where Steps Missed
Violator Does Not Respond
Mitigation
Write Report of Mitigation Send to Comm.'s Office
Violator Calls Comm. or Dep. Comm.
No Mitigation
Violator Files For Hearing

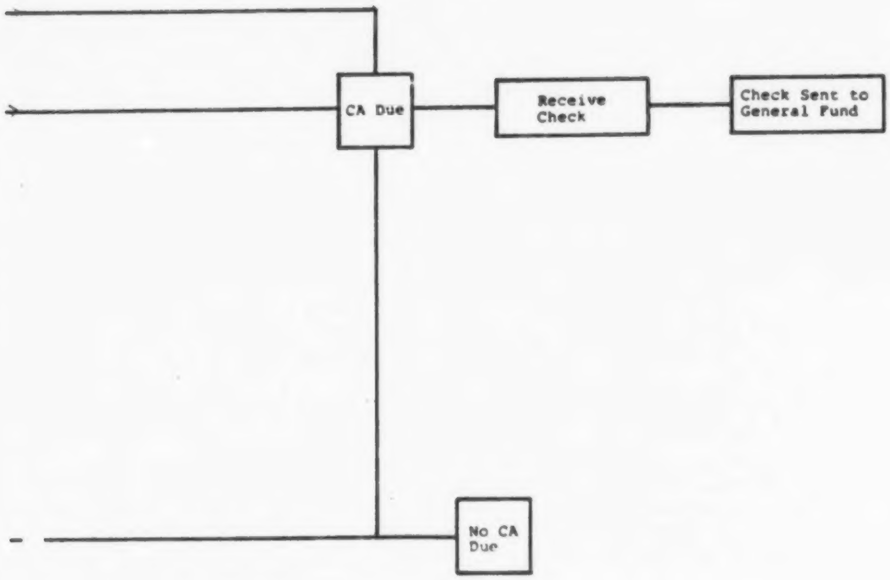

No 602 CA Due
Violator Achieves Compliance On Schedule
Violator Does Not Achieve Compliance Schedule
Send Letter Requesting Violator Submit Costs (optional)
Log Costs, Check Against Plans & Specs
Violator Satisfied
Monitor End of 20 Day Period For Each NV
Violator Not Satisfied; Files For Hearing
Prepare For Hearing
Hold Hearing


Obtain More Info (optional)
Recalculate Assessment(s)
Decide Whether/ How Much CA to Impose
Send Out NV For Total Amount Due
Violator Does Not Respond
Violator Calls Comm. or Dep. Comm.
Violator Files Petition For Correction


Mitigation
Write Mitigation Report; Send to Comm.'s Office
No Mitigation
Violator Satisfied
Monitor End of 20 Day Period
Violator Not Satisfied: Files Petition For Correction
Copy of Petition Sent to Enf. Unit For Appraisal


Information Is Complete
Evaluate For Completeness And Accuracy
Information Incomplete
Request More Information
Log And Evalute


Sufficient Correction Made
Insufficient Correction Made
Violator Files For Hearing
Set Hearing Date
Attend Hearing
No Correction
Correction


CA Due
Receive Check
Check Sent to General Fund
No CA Due

ATTACHMENT C

SAMPLE CALCULATION OF ADMINISTRATIVE COST SAVINGS

ATTACHMENT C

SAMPLE CALCULATION OF ADMINISTRATIVE COST SAVINGS

"Order Follow-up" now costs the Department $131 per case. Under the civil assessment system, if no mass mailing is conducted, average costs will drop 37 percent to $82 per case; if a mass mailing is conducted, average costs will drop 72 percent to $37 per case. These figures are based on the following calculations:

- If there is no mass mailing:

  (1) 37 percent of existing sources will have received official notification of liability for failure to abate. 72 percent of these will comply before they are inspected (.37 x .72 = .27). For this 27 percent, order follow-up costs will be $0.

  (2) Of the cases who received notification, 28 percent will choose not to comply. For this 10 percent (.37 x .28 = .10) of all cases, order follow-up costs will be $131.

  (3) Of the 63 percent who have not received official notification prior to detection, 72 percent will attempt to cut avoidable delay in complying with the terms of an order. The most conservative estimate the Air Compliance staff was willing to make places the percentage of delay that is avoidable at 30 percent; hence 22 percent (.72 x .30 = .22) of all delay should be cut, a saving of $29 per case. (The staff's best estimates of avoidable delay were in the 60 - 70 percent range.)

  (4) The remaining 18 percent will not be affected by civil assessments. Average order follow-up costs will remain at $131 per case.

Average order follow-up costs for all cases will be the weighted averages of all three groups, an average of $82 per case.

- If there is a mass mailing:

  (1) Case load will drop 72 percent.

  (2) Those cases that continue to violate and receive orders will not cut delay.

Average costs will drop by 72 percent to $37 (.72 x 131 = 37) per case.

ATTACHMENT D

PROGRESS REPORT

ENFORCEMENT COSTS - EXISTING SYSTEM

ATTACHMENT D

PROGRESS REPORT

ADMINISTRATIVE COSTS IN EXISTING SYSTEM

TIMES AND COSTS

Procedure #1: Incomplete Progress Reports

Review Progress Reports Received

Progress reports are required monthly, and the average source under order submits a total of nine reports. When progress reports are received, they are examined to ensure that all information has been submitted (25 percent are incomplete). The costs of enforcement in this case are the costs of checking all 9 reports.

Incidence: 9 per order
Time required per report:
    Eng. Int. 3 min.
Cost per order:
    Eng. Int. $4.05

Call Company to Obtain Information

When information is missing, a staff member will call the company to ask it to complete its report and frequently to obtain the information on the telephone. DEP staff will ask the company to submit a special report containing this information. This procedure often requires several calls.

Incidence:
Time per step:
    Sr. Eng. 8 min.
    Eng. Int. 8 min.
Cost per order:
    Sr. Eng. $4.02
    Eng. Int. 2.85
Total $6.87

Receive Special Report On Missing Information

When asked to do so, a company will almost always send in the special report. To avoid double counting, the cost of evaluating this report is not included in total enforcement costs: if this information had been submitted on time, it would still have to be evaluated. Some further checking will be done to see if all required information has been submitted, but these costs are part of the first step of this sequence.

Incidence: 2.03 per order (assumes 90% of those requested to submit further information do so)
Time per report:
Eng. Int. 5 min.
Cost per order:
Eng. Int. $1.44

Total For Procedure #1	
	$ 4.05
	6.87
	1.44
	$12.36

Procedure #2: Missing And Late Progress Reports

Detect Late or Missing Report

A check of the progress report records is made every two weeks to see if reports due have been submitted. To obtain the time spent on each progress report, the monthly cost of examining the progress report records was divided among all reports due monthly.

Incidence: 9 per order
Time per order:
Eng. Int. 1.25 min.
Cost per order
Eng. Int. $1.58

Send Form Letter to Delinquent Company

When reports have not been submitted on time (as happens with 17 percent of all reports), a form letter will be sent to the delinquent company, requesting that a report be submitted.

Incidence: 1.53 per order
Time per report:
Eng. Int. 8 min.
Clerical 10 min.
Cost per order:
Eng. Int. $1.72
Clerical 1.46
Total $3.18

Receive Phone Call from Company

An occasional response to the receipt of the form letter is a phone call detailing reasons for delay. Such a call is usually short, during which the Department typically simply requests a report, a request which is usually honored promptly.

Incidence: .15 per order
Time per report:
Eng. Int. 5 min.
Clerical 5 min.
Cost per order:
Eng. Int. $.60
Clerical .10
Total $.70

Call Company, if Necessary

The 30 percent of the cases that fail to respond quickly to the request for a progress report receive a phone call asking for the delinquent report. This call may take up to twice as long as a call originated by the company, since it is sometimes difficult to reach the correct person.

Incidence: .46 per order
Time per report:
Eng. Int. 10 min.
Cost per order:
Eng. Int. $.66

Total For Procedure #2	$ 1.58
	3.18
	.60
	.66
	$ 6.02

Total Enforcement Costs per Order	Procedure #1	$12.36
	Procedure #2	6.12
		$18.48

ATTACHMENT E

PROGRESS REPORT ENFORCEMENT COSTS - CIVIL ASSESSMENT SYSTEM

ATTACHMENT E

PROGRESS REPORT ADMINISTRATIVE COSTS

CIVIL ASSESSMENT SYSTEM

The costs of using the civil assessment program for following up progress reports will be $11.15 per average case, 40 percent less than the costs of using the old enforcement system. Some steps are potentially expensive, but it is likely that follow-up on many progress reports will be reduced, thus cutting costs significantly.

Review Progress Reports Received	Progress reports will undergo the same scrutiny when first received as they do now; costs will therefore be the same. Incidence: 9 per order Time per report Eng. Int. 3 min. Cost per order: Eng. Int. $4.05
Call Company to Obtain Information	This step will be replaced by the civil assessment warning letter requiring a special report on missing information. No Cost
Detect Late or Missing Progress Report	The file search will be conducted as before, and at the same total cost. Incidence: 9 per order Time per report: Eng. Int. 1.25 min. Cost per order: $1.58
Send Notification Letter	For both missing and inadequate progress reports, a warning letter will be sent the regulatee. This form letter needs little time to fill out, but must be logged out of the office. Incidence: 1.42 per order Time per report: Eng. Int. 7 min. Clerical 15 min. Cost per order: Eng. Int. $1.01 Clerical 1.46 Total $2.47

Incidence includes:
1) 100 percent incidence of incomplete reports (an average of 1 per order)
2) 42 percent incidence of missing reports per order (an average of .42 per order)

Receive Phone Call from Violator

Since financial liabilities are at issue, the incidence of phone calls received by the Department may rise. If twice as many regulatees who receive warning letters respond with a phone call as before, the average order recipient will respond .3 times during the course of his order. These calls will probably be handled by the engineer responsible for that order.

Incidence: .3 per order

Time per report:	
Prin. Eng.	10 min.
Sr. Eng.	10 min.
Cost per order:	
Prin. Eng.	$ .78
Sr. Eng.	.63
Total	$1.41

Receive Special Report

Most regulatees will submit a report containing data missing from a regular progress report when asked to do so. When these are received, a Department staff member must examine them for completeness. Eighty-five percent of Department regulatees respond favorably to such a request even when no assessment is at stake. At least 95 percent should do so when prodded by the threat of a 601 assessment.

Incidence: .95 per order

Time per report:	
Eng. Int.	5 min.
Cost per report:	
Eng. Int.	$ .68

Decide What Action to Take

After the regulatee responds (or fails to respond) the Air staff must decide whether to impose the assessment. Ninety-five percent of those who receive a warning letter will respond with a progress report. If criteria for assessments are clearly laid out, such a decision will be largely pro-forma, turning on whether proper procedures have been followed, and exploring the previous history of the case in question.

Incidence: .07 per order (assumes 95 percent submit a report)

Time per report:	
Prin. Eng.	5 min.
Eng. Int.	5 min.
Cost per order:	
Prin. Eng.	$ .09
Eng. Int.	.05
Total	$ .14

Send Notice of Assessment

Sending out an assessment letter should eventually involve little additional decision making (again assuming criteria are clearly laid out)

Incidence: .07 per order (assumes all those who fail to submit a report will be assessed)

Time per report:	
Dir.	5 min.
Asst. Dir.	5 min.
Eng. Int.	10 min.
Clerical	15 min.
Cost per order:	
Dir.	$ .11
Asst. Dir.	.10
Eng. Int.	.10
Clerical	.10
Total	$ .41

Receive Phone Call from Regulatee

The regulatee may wish to call to attempt to avoid payment of the penalty. Issues to be discussed in this phone call include the 601 procedures used by the Department and the past compliance record of the regulatee. If 30 percent of those receiving an assessment letter respond with a phone call:

Incidence:	.02 per order
Time per report:	
Prin. Eng.	10 min.
Cost per order	
Prin. Eng.	$ .05

Regulatee Requests Hearing

One tactic that a regulatee may use to avoid payment of an assessment is to threaten the Department with the possibility of a hearing. Hearing requests will usually be withdrawn, however: to contest a progress report violation would cost the regulatee substantially more than the $50 or $100 owed for the violation. A small fraction of regulatees, usually convinced that the Department has made some mistake, may be willing to go through with a hearing. This number should be no larger than the 3 percent of order recipients in the history of the Air Compliance Unit who have filed for hearings on their orders. If 3 percent of those assessed 601 assessments request a hearing:

Incidence:	.002 per order
Time per report:	
Dir.	240 min.
Asst. Dir.	240 min.
Prin. Eng.	165 min.
Sr. Eng.	165 min.
Clerical	510 min.
Cost per order:	
Dir.	$ .04
Asst. Dir.	.03
Prin. Eng.	.02
Sr. Eng.	.02
Clerical	.02
Total	$ .13

Send Reminder Letter

A small number of those sent assessment letters (perhaps 10 percent) will fail to send in a check within the allotted period of time. The Department will send them a reminder letter, signed by the Assistant Director.

Incidence:	.007 per order
Time per report:	
Asst. Dir.	5 min.
Eng. Int.	7 min.
Clerical	10 min.
Cost per order:	
Asst. Dir.	$ .01
Eng. Int.	.01
Clerical	.01
Total	$ .03

Regulatee Does Not Respond to Reminder Letter

If the regulatee fails to respond to the reminder letter, the DEP can file papers with the Superior Court. Because this problem will occur so seldom, costs per order should be negligible.

No Cost

Receive and Transmit Assessment Payments

Checks received must be logged and sent to the Finance Office.

Incidence:	.07 per order
Time per report:	
Eng. Int.	10 min.
Clerical	15 min.
Cost per order:	
Eng. Int.	$ .10
Clerical	.10
Total	$ .20